CB Series PC/104-*Plus* Multiport Serial Module

User's Manual

www.moxa.com/product

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1

Introduction

Welcome to the CB Series of PC/104-*Plus* communication modules, a multiport serial module for industrial applications. It is designed for PC/104-*Plus* CPU boards that accept the PC/104-*Plus* expansion interface. Optional DB9 and DB25 cables are available to connect different devices. The device drivers make full use of the 128-byte Tx/Rx FIFO and on-chip flow control, which allows up to 921.6 Kbps data transmission.

The CB Series includes the following models:

CB-108: 8 ports, RS-232
CB-108-T: 8 ports, RS-232, wide temperature
CB-114: 4 ports, RS-232/422/485
CB-114-T: 4 ports, RS-232/422/485, wide temperature
CB-134I: 4 ports, RS-422/485, optical isolation protection
CB-134I-T: 4 ports, RS-422/485, optical isolation protection, wide temperature

2 KV optical isolation is provided on optical isolation models. Wide temperature models are rated for operation between -40 to 85°C.

The following topics are covered in this chapter:

- **Overview**
- **Package Checklist**
- **Product Features**
- **Product Specifications**

Overview

The CB Series PC/104-*Plus* module is designed to be used with PC/104-*Plus* CPU modules or CPU cards with the PC/104-*Plus* expansion interface. Models are available for RS-232, RS-422, and RS-485, with 4 or 8 ports. The serial ports are accessed through a 40-pin box header connector on the module. DIP switches allow you to select the serial interface. The industry-standard MOXA UART (16C550 compatible) is fully programmable. Built-in 15 KV ESD protection protects devices connected to the serial network.

Package Checklist

MOXA performs a careful mechanical and electrical inspection of each module prior to shipping. Your module should arrive in perfect electrical order, free of any marks or scratches. Please handle the module by the edges only, since your body's static charge can damage the integrated circuits. When the module is not in use, please keep it in the anti-static package provided. You may also use this package to return the module if it requires repair.

The CB Series module is shipped with the following items:

- CB Series PC/104-*Plus* multiport serial module
- Documentation and Software CD
- Quick Installation Guide
- 5-year product warranty statement

Note: Please notify your sales representative if any of the above items are missing or damaged.

Product Features

The CB Series module features the following:

- 4 or 8 serial ports (depending on model)
- RS-232, RS-422, or RS-485 operation (depending on model)
- 128-byte FIFOs and on-chip flow control
- Up to 921.6Kbps data transmission speed
- Built-in 15 KV ESD protection
- Onboard Tx, Rx LED indicators for each port
- Optional wide temperature support (-40 to 85°C)

Product Specifications

CB Series PC/104-*Plus* Multiport Serial Module

Hardware	
I/O controller	MU860 (16C550C compatible)
Connector Type	40-pin box header
Interface	
Bus	PC/104-*Plus* (PCI) bus
No. of Ports	4 ports (CB-114, CB-134I) 8 ports (CB-108)
Max. No. of Modules	4
Signals	
RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422	TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
4-wire RS-485	TxD+(B), TxD-(A), RxD+(B), RxD-(A), GND
2-wire RS-485	Data+(B), Data-(A), GND
Performance	
Baudrate	50 bps to 921.6 Kbps
Configuration	
Parity	None, Even, Odd, Space, Mark
Data Bits	5, 6, 7, 8
Stop Bit(s)	1, 1.5, 2
IRQ	BIOS assigned
FIFO	128 bytes
Additional Settings	Serial interface selection by DIP switch
Driver Support	DOS Windows 2000, Windows XP/2003/Vista (x86 and x64) Linux 2.4, Linux 2.6 (x86 and x64)
Power and Environment	
Operating Temperature	Standard models: 0 to 55°C (32 to 131°F) "-T" models:, -40 to 85°C (-40 to 185°F)
Operating Humidity	5 to 95% RH
Storage Temperature	-40 to 70°C (-40 to 158°F)
ESD Protection	Embedded 15 KV ESD protection
Other	
Dimensions (W x D)	96 x 90 mm
Regulatory Approvals	EN55022 Class A, EN55024, EN6100-3-2, EN61000-3-3, FCC Part 15 Class A
Warranty	5 years

2

Hardware Installation

This chapter explains how to install the CB Series PC/104-*Plus* multiport serial module.

The following topics are covered:

- **Hardware Installation**
- **Block Diagrams**
  - Rotary Switch
- **Serial Interface Selection**

Hardware Installation

Installing the CB Series module is easy. Before inserting the module into the PC/104-*Plus* slot, you must first configure the I/O base address, interrupt vector, IRQ, and serial interface (for select models).

ATTENTION

Safety First!
To prevent damage to your system or board, make sure your embedded PC's power is turned off before installing your CB Series module.

Step 1: Shut off power to your embedded PC and to any peripheral devices. After shutting off power, remove the cover of your embedded PC.

Step 2: Use the DIP switches on the module to select the serial interface. Details for each model are provided later in this chapter.

Step 3: Insert the module firmly into the embedded PC's PC/104-*Plus* slot.

Step 4: Screw the control board in place.

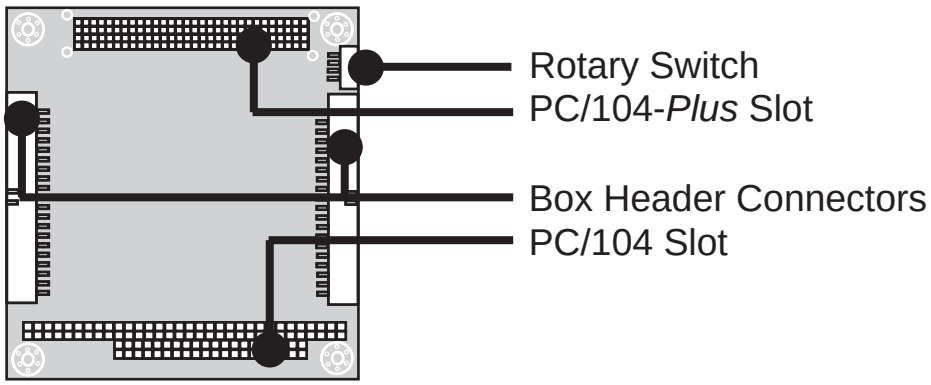
Step 5: Connect the cables.

Step 6: Power on the embedded PC. The BIOS will automatically set the IRQ and I/O address

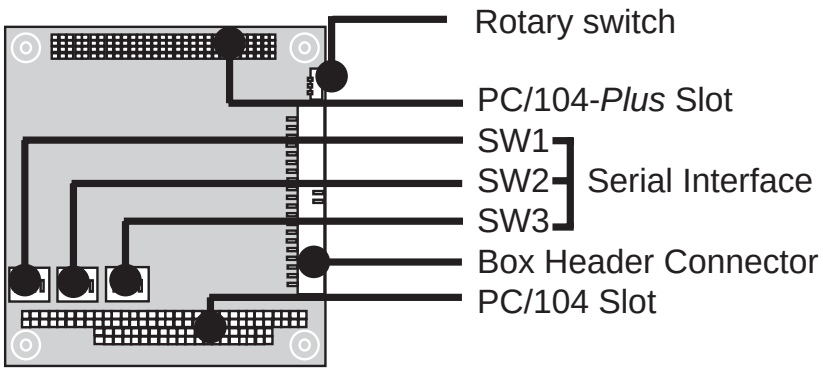
Step 7: Proceed with the software installation. Please refer to Chapter 3.

Block Diagrams

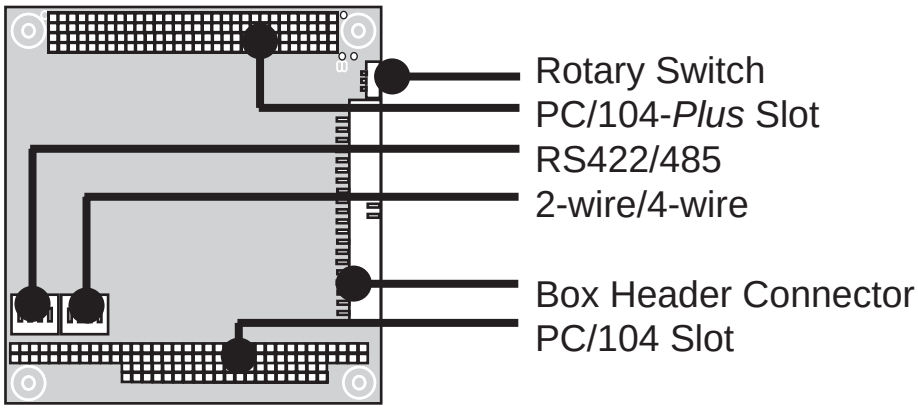
CB-108



CB-114



CB-134I



Rotary Switch

A rotary switch on the board makes it easy to set the appropriate signals, particularly when installing multiple PC/104-Plus modules in the same unit. The rotary switch, which looks like a clock, provides a bi-directional path with no signal propagation delay. The first module on the stack should be set to CLK0, the second to CLK1, etc., to eliminate clock skew between modules.

Serial Interface Selection

For the CB-114 and CB-134I, the serial interface is selecting using the onboard DIP switches.

CB-114

Mode	S1	S2	S3
RS-232	---	---	ON
RS-422	---	ON	off
4-wire RS-485	ON	off	off
2-wire RS-485	off	off	off

CB-134I

Mode	S1	S2
RS-422	---	off
4-wire RS-485	off	ON
2-wire RS-485	ON	ON

3

Software Installation

After installing the CB Series module in your embedded computer, the next step is installing the software. Drivers for various operating systems are provided, including DOS, Windows, and Linux. This chapter explains how to install and remove the CB Series driver.

The following topics are covered in this chapter:

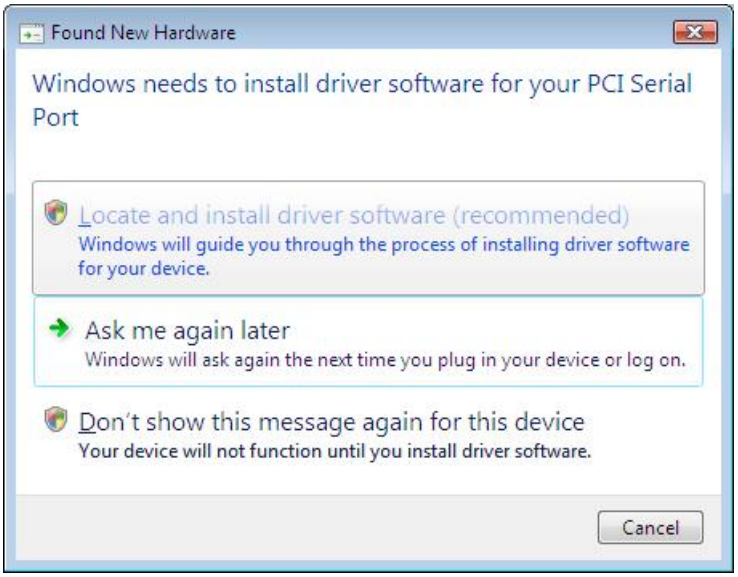
- **Windows Vista (32-bit and 64-bit)**
  - Installing the Driver
  - Using Device Manager to Verify Installation
  - Port Configuration
- **Windows XP, 2003 (32-bit and 64-bit)**
  - Installing the Driver
  - Using Device Manager to Verify Installation
  - Port Configuration
- **Windows XP, 2003 (32-bit and 64-bit)**
  - Installing the DriverUsing Device Manager to Verify Installation
  - Port Configuration
  - Using PComm
  - Using Event Log
  - Disabling the Module
  - Uninstalling the Module
- **Windows 2000**
  - Installing the Driver
  - Using Device Manager to Verify Installation
  - Port Configuration
  - Using PComm
  - Using Event Log
  - Disabling the Module
  - Uninstalling the Module
- **Linux (32-bit and 64-bit)**
- **DOS**
  - Installing the Driver
  - Driver Setup
  - Loading the Driver
  - Unloading the Driver
- **Windows CE 5.0**
  - Installing the driver

Windows Vista (32-bit and 64-bit)

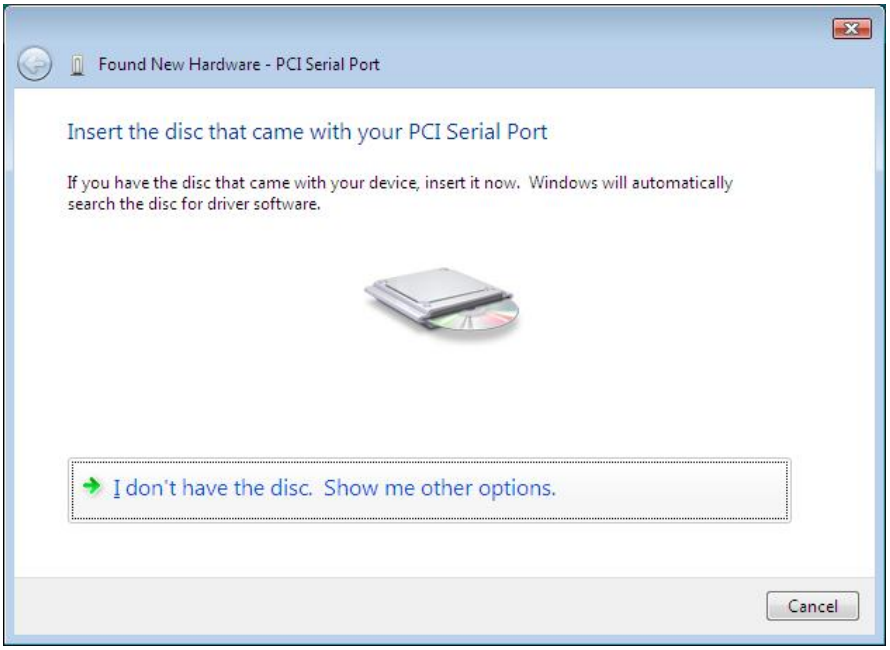
The Windows Vista (32-bit/64-bit) drivers conform to the Win32 COMM API standard and support all models in the CB Series. In the following instructions, the CB-114 is used as an example.

Installing the Driver

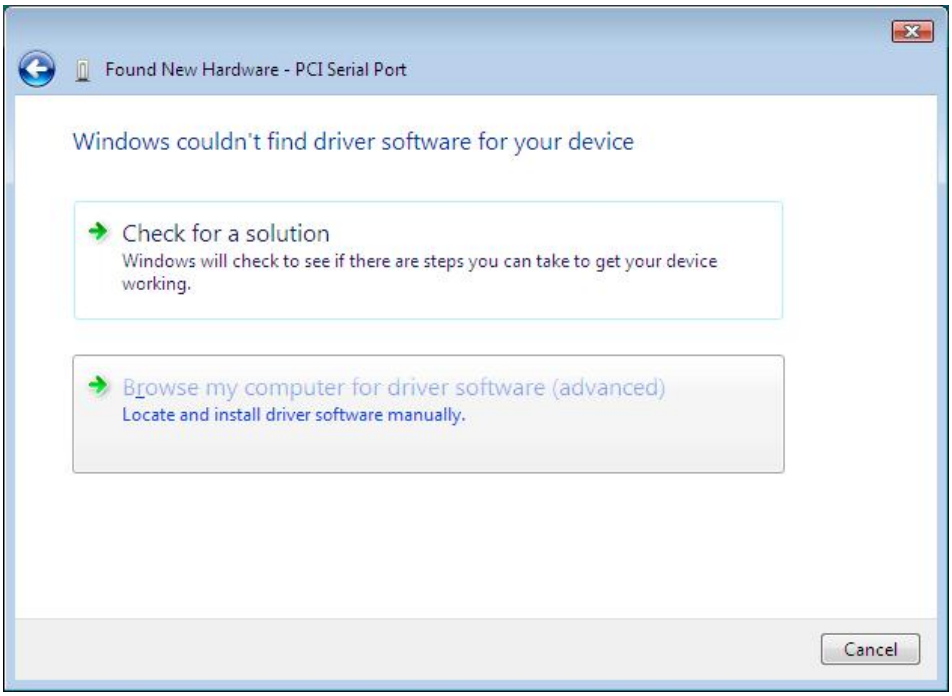
1. After the module has been plugged into a PC/104-*Plus* slot, turn the embedded computer on.
2. Windows will automatically detect the new module and the **Found New Hardware Wizard** will open automatically. Select **Locate and install driver software (recommended)**.


Found New Hardware
Windows needs to install driver software for your PCI Serial Port
Locate and install driver software (recommended)
Windows will guide you through the process of installing driver software for your device.
Ask me again later
Windows will ask again the next time you plug in your device or log on.
Don't show this message again for this device
Your device will not function until you install driver software.
Cancel

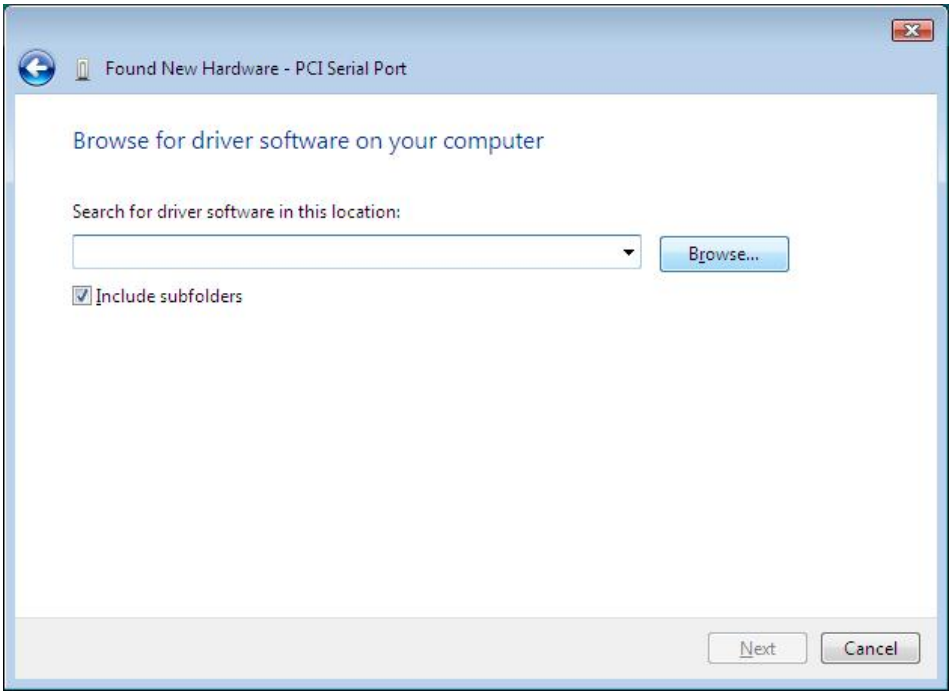
3. When prompted to insert the disc, select **I don't have the disc. Show me other options.**

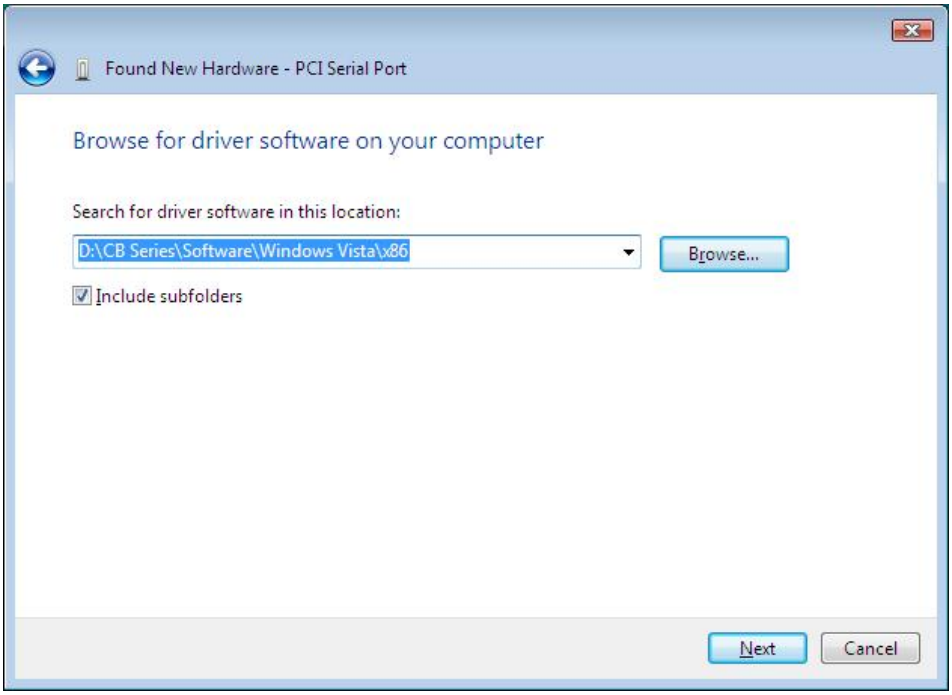

Found New Hardware - PCI Serial Port
Insert the disc that came with your PCI Serial Port
If you have the disc that came with your device, insert it now. Windows will automatically search the disc for driver software.
I don't have the disc. Show me other options.
Cancel

4. Select **Browse my computer for drier software (advanced)**.


Found New Hardware - PCI Serial Port
Windows couldn't find driver software for your device
Check for a solution
Windows will check to see if there are steps you can take to get your device working.
Browse my computer for driver software (advanced)
Locate and install driver software manually.
Cancel

5. Click **Browse** to manually specify the folder in which to find the driver. For 32-bit (x86) platforms, select the **\CB Series\Software\Windows Vista\x86** folder on the CD. For 64-bit (x64) platforms, select the **\CB Series\Software\Windows Vista\x64** folder on the CD. Click **Next** to continue.

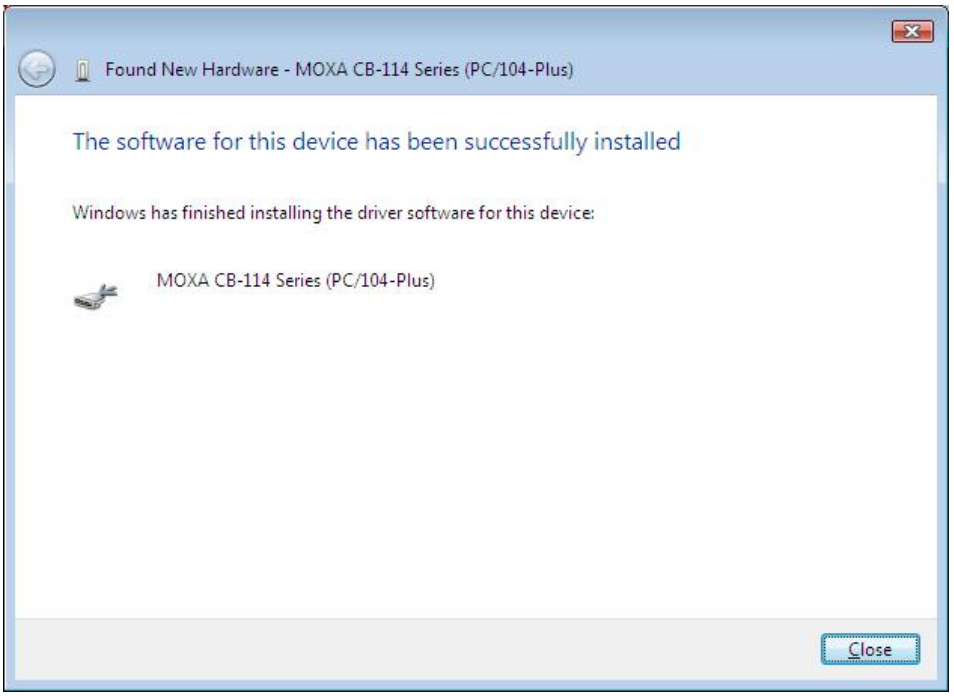




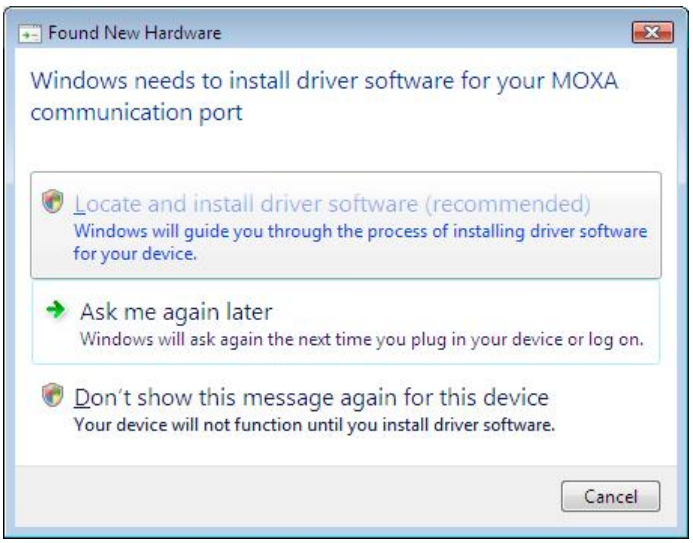
6. If you see a warning that the software has not passed Windows Logo testing, click **Install this driver software anyway**.

Windows Security
Windows can't verify the publisher of this driver software
Don't install this driver software
You should check your manufacturer's website for updated driver software for your device.
Install this driver software anyway
Only install driver software obtained from your manufacturer's website or disc. Unsigned software from other sources may harm your computer or steal information.
See details

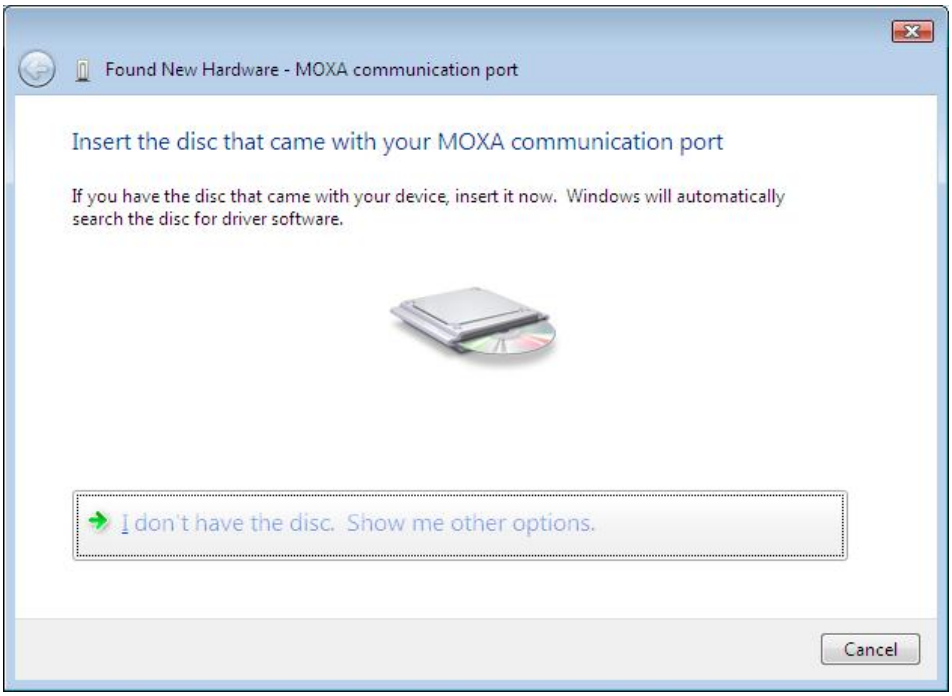
7. After the files have been installed, click **Close**.


Found New Hardware - MOXA CB-114 Series (PC/104-Plus)
The software for this device has been successfully installed
Windows has finished installing the driver software for this device:
MOXA CB-114 Series (PC/104-Plus)
Close

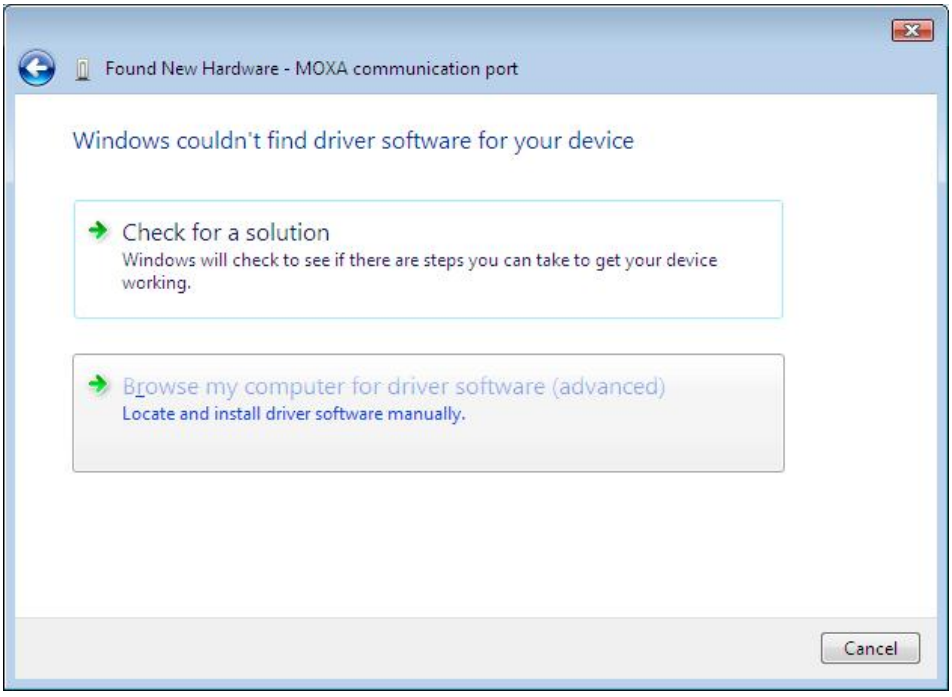
8. After the module is installed, you will be prompted to install the new serial ports. A **Found New Hardware Wizard** window will open for the first serial port, port 0. Select **Locate and install driver software (recommended)** to continue.


Found New Hardware
Windows needs to install driver software for your MOXA communication port
Locate and install driver software (recommended)
Windows will guide you through the process of installing driver software for your device.
Ask me again later
Windows will ask again the next time you plug in your device or log on.
Don't show this message again for this device
Your device will not function until you install driver software.
Cancel

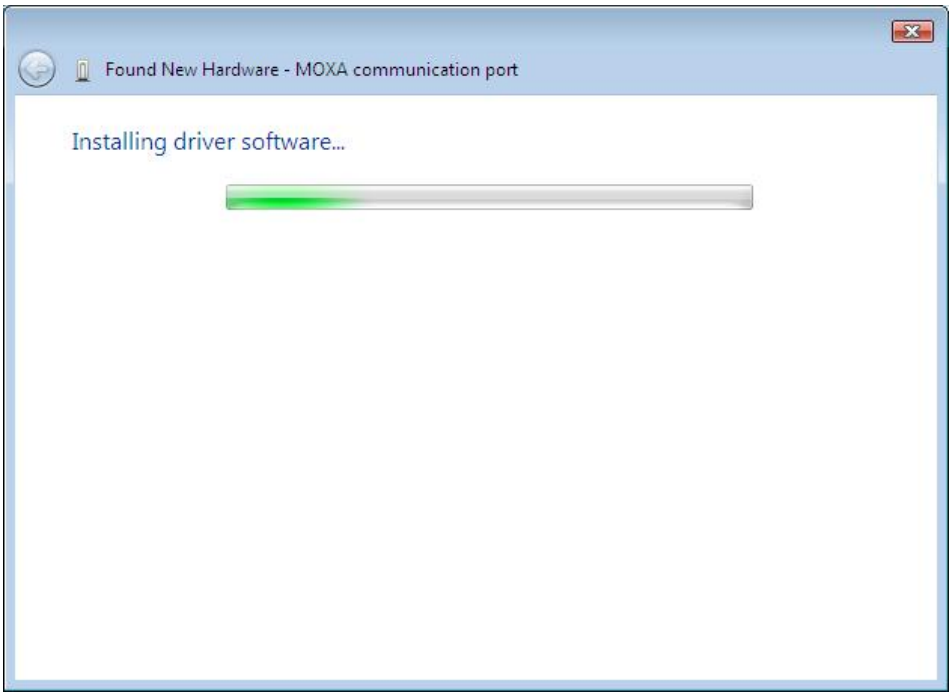
9. Select **I don't have the disc. Show me other options**.


Found New Hardware - MOXA communication port
Insert the disc that came with your MOXA communication port
If you have the disc that came with your device, insert it now. Windows will automatically search the disc for driver software.
I don't have the disc. Show me other options.
Cancel

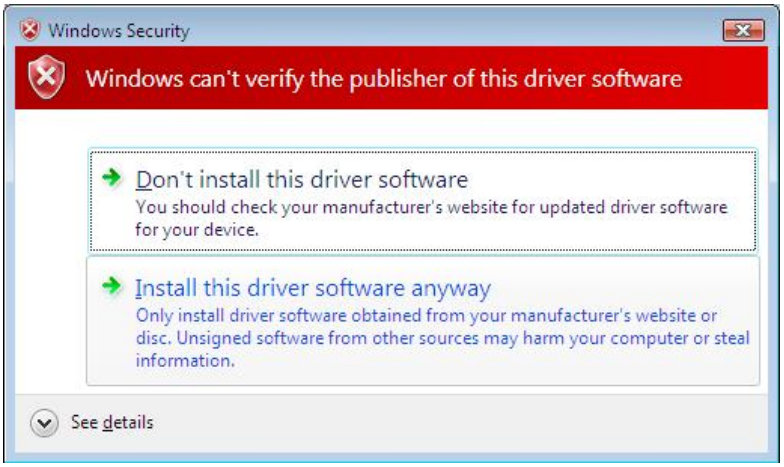
10. Select **Browse my computer for driver software (advanced)**.


Found New Hardware - MOXA communication port
Windows couldn't find driver software for your device
Check for a solution
Windows will check to see if there are steps you can take to get your device working.
Browse my computer for driver software (advanced)
Locate and install driver software manually.
Cancel

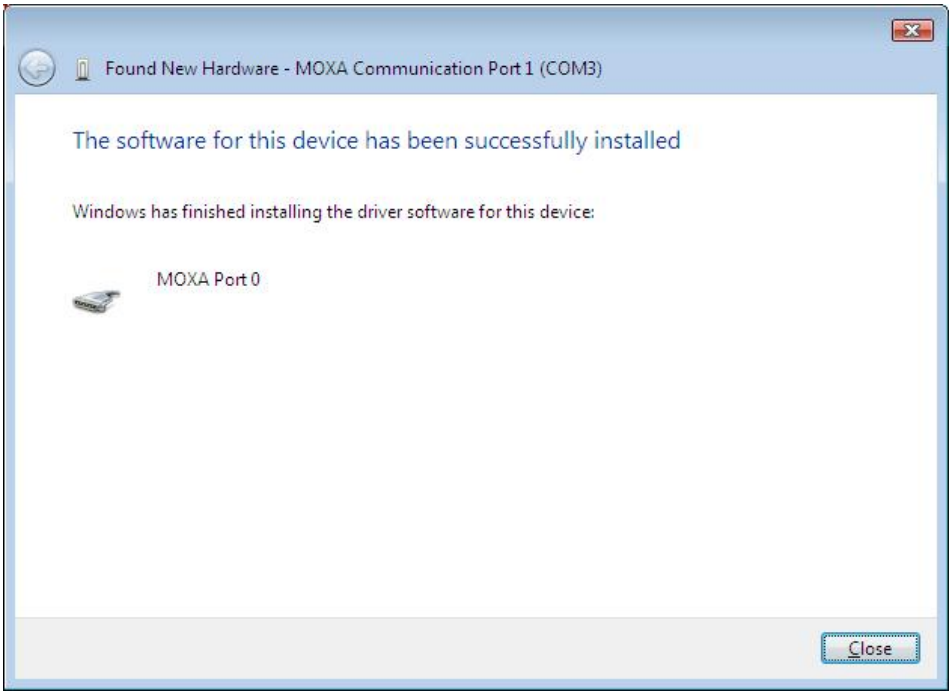
11. Click **Browse** to manually specify the folder in which to find the driver. For 32-bit (x86) platforms, select the **\CB Series\Software\Windows Vista\x86** folder on the CD. For 64-bit (x64) platforms, select the **\CB Series\Software\Windows Vista\x64** folder on the CD. Click **Next** to continue.
12. Windows will install the driver software.



13. If you see a warning that the software has not passed Windows Logo testing, click **Install this driver software anyway**.


Windows Security
Windows can't verify the publisher of this driver software
Don't install this driver software
You should check your manufacturer's website for updated driver software for your device.
Install this driver software anyway
Only install driver software obtained from your manufacturer's website or disc. Unsigned software from other sources may harm your computer or steal information.
See details

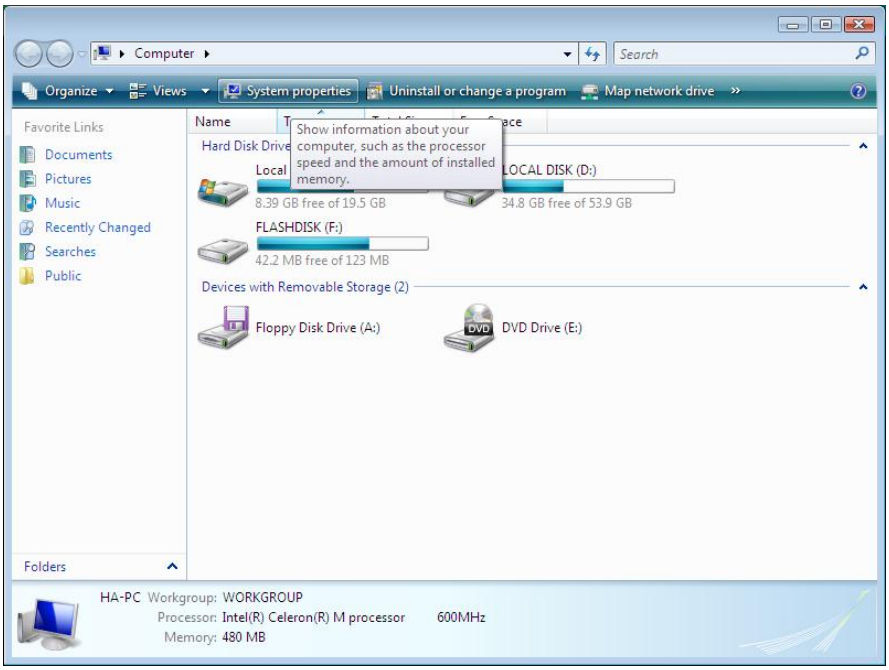
14. After the files have been installed, click **Close**. The remaining serial ports will automatically install in the background.


Found New Hardware - MOXA Communication Port 1 (COM3)
The software for this device has been successfully installed
Windows has finished installing the driver software for this device:
MOXA Port 0
Close

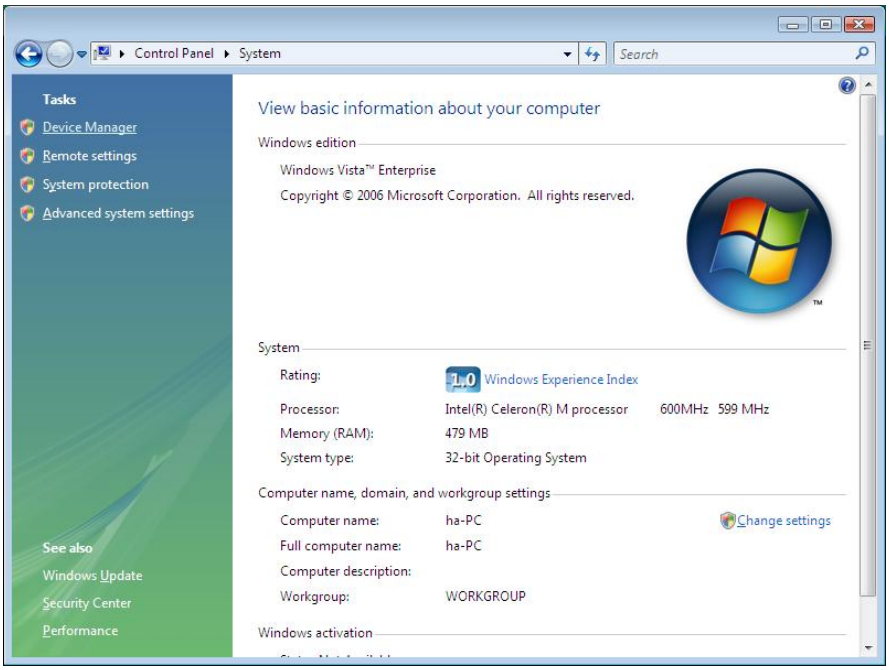
Using Device Manager to Verify Installation

You can use Windows Device Manager to verify proper installation of the CB Series module. In the following instructions, the CB-114 is used as an example.

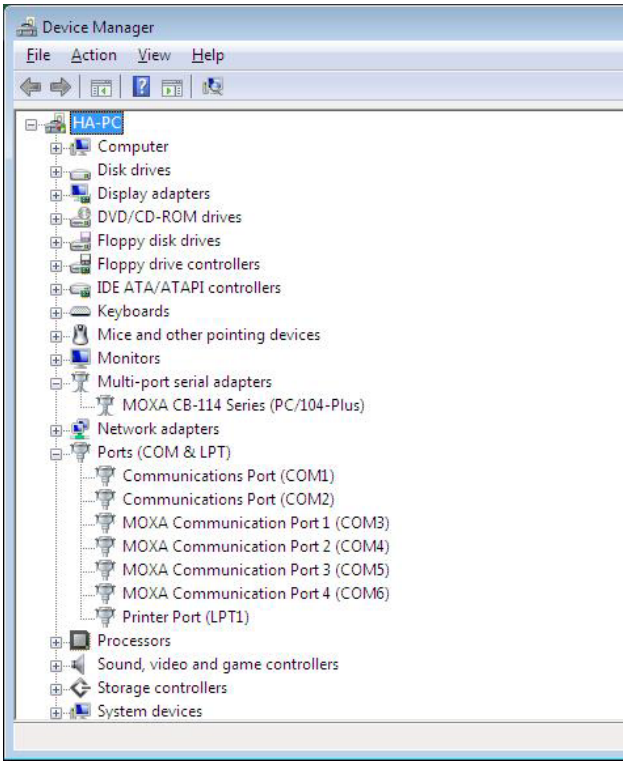
1. Under **My Computer**, click **System Properties**.



2. In the **System** window, click **Device Manager**.



3. In the **Device Manager** window, you should see your CB Series module under M**ulti-port serial adapters**. You should also see MOXA communication ports under **Ports (COM & LPT)**.

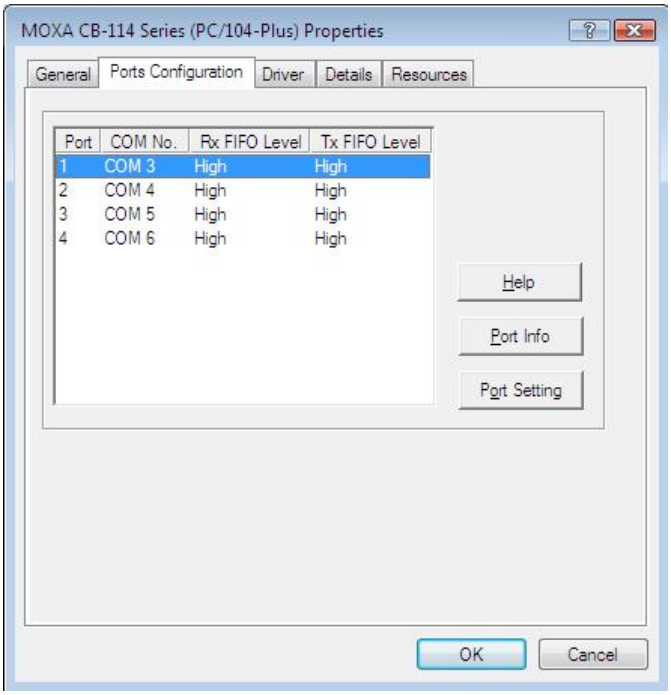


4. If you see any special marks, such as a question mark or an exclamation mark, next to the MOXA items, the installation of your module or serial ports was not successful. Examine the Windows event log for details.

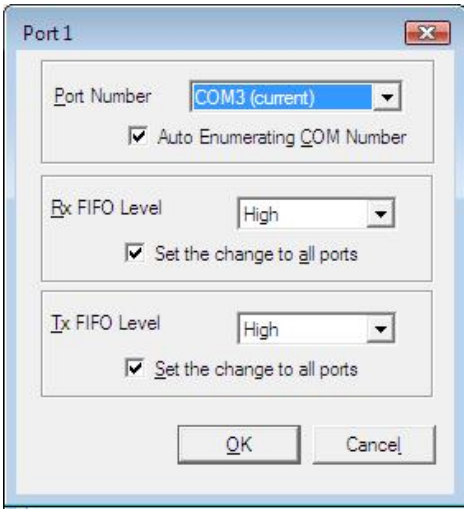
Port Configuration

After the driver is installed, a CB Series Properties window will appear. The system will map the serial ports automatically. It will prompt you to take care of port configuration if another CB Series module has been installed on the PC.

1. Select a specific port under the **Port Configuration** tab and click **Port Setting.**



2. Under **Port Number**, select a COM number to assign to the serial port.



Select **Auto Enumerating COM Number** to map subsequent ports in numerical order. For example, if COM 3 is assigned to Port 1, then COM 4 will be automatically assigned to Port 2.

	Tx FIFO	Rx FIFO
High	128 bytes	120 bytes
Middle	64 bytes	60 bytes
Low	1 byte	1 byte

Select an **Rx FIFO Trigger.** The default value is 120 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.

Select a **Tx FIFO Size**. The default value is 128 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.

3. Click **OK** to approve the port settings. Click **OK** again to close the **CB Series Properties** window and apply the new port settings.

Windows XP, 2003 (32-bit and 64-bit)

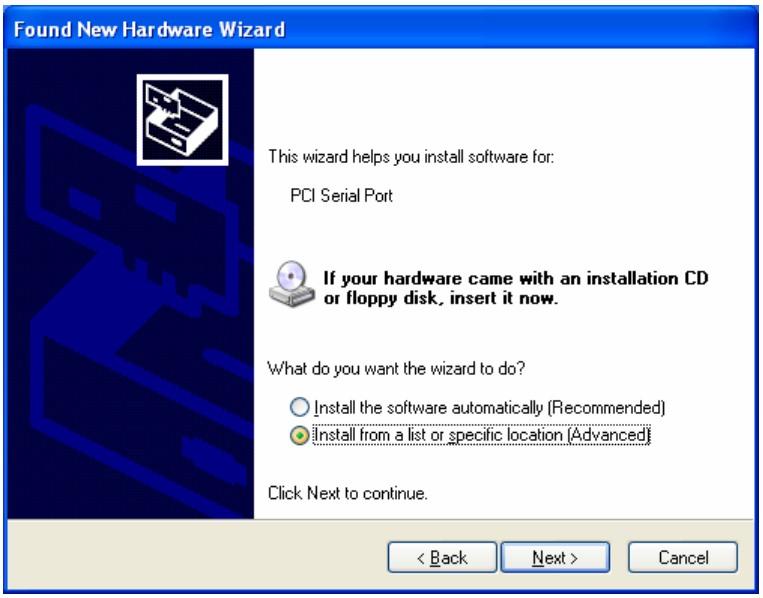
The Windows XP and 2003 (32-bit and 64-bit) drivers conform to the Win32 COMM API standard and support all models in the CB Series. In the following instructions, the CB-114 is used as an example.

Installing the Driver

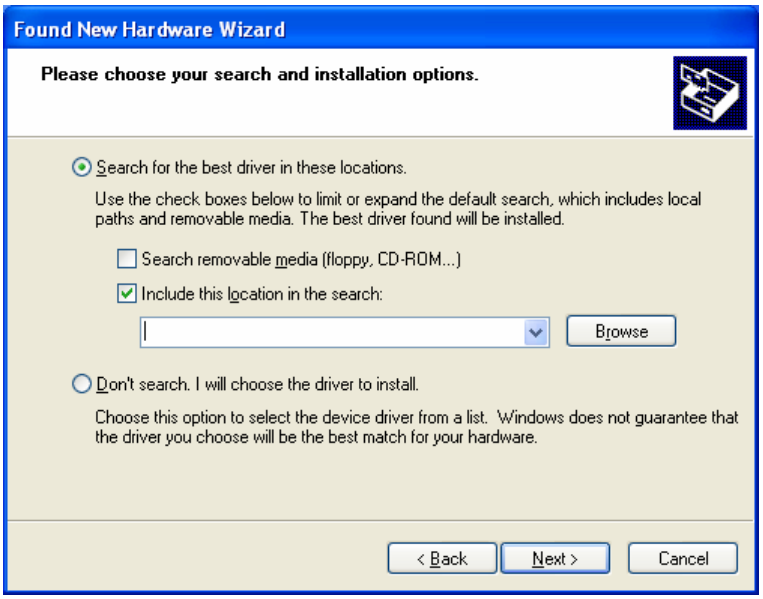
1. After the module has been plugged into a PC/104-*Plus* slot, turn the embedded computer on.
2. Windows will automatically detect the new module and the **Found New Hardware Wizard** will open automatically. Select **No, not this time** and click **Next**.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

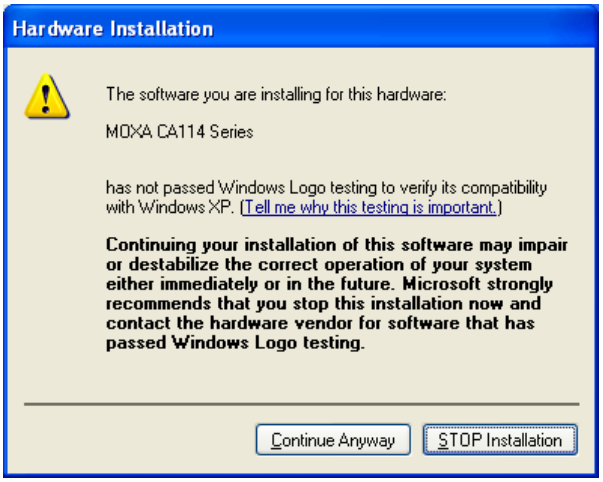
3. Select **Install from a list or specific location (Advanced)** and click **Next** to continue.


Found New Hardware Wizard
This wizard helps you install software for:
PCI Serial Port
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

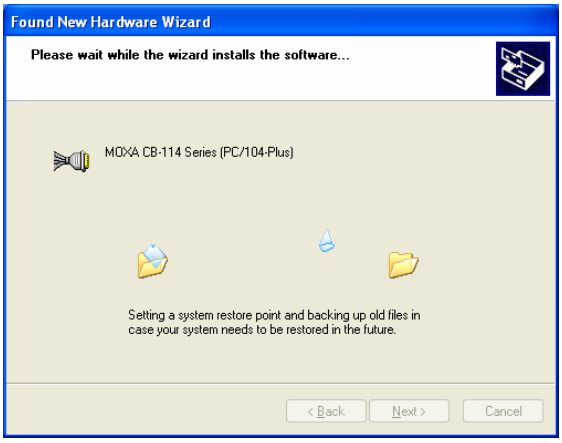
4. Click **Browse** to manually specify the folder in which to find the driver. For 32-bit (x86) platforms, select the **\CB Series\Software\Windows XP_2003\x86** folder on the CD. For 64-bit (x64) platforms, select the **\CB Series\Software\Windows XP_2003\x64** folder on the CD. Click **Next** to continue.

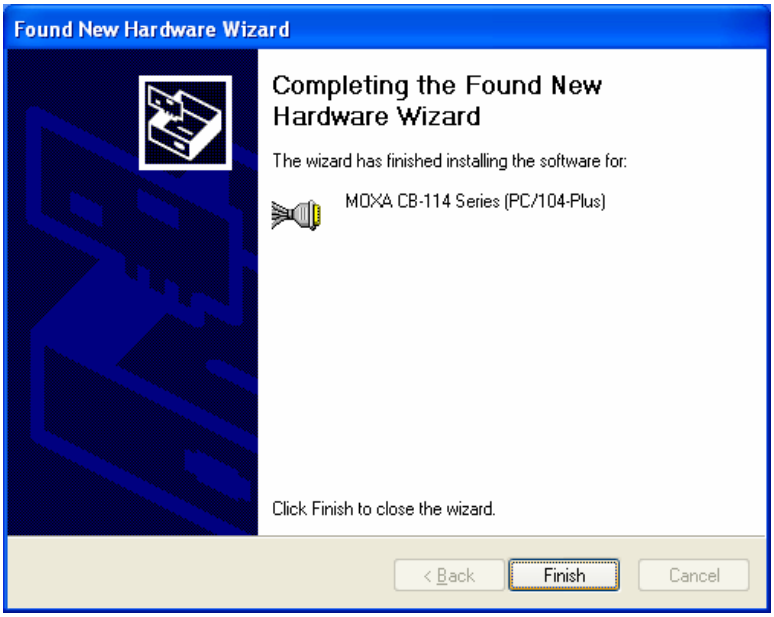

Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

5. If you see a warning that the software has not passed Windows Logo testing, click **Continue Anyway**.


Hardware Installation
The software you are installing for this hardware:
MOXA CA114 Series
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

6. Windows will install the drivers. When the installation is complete, click **Finish**.

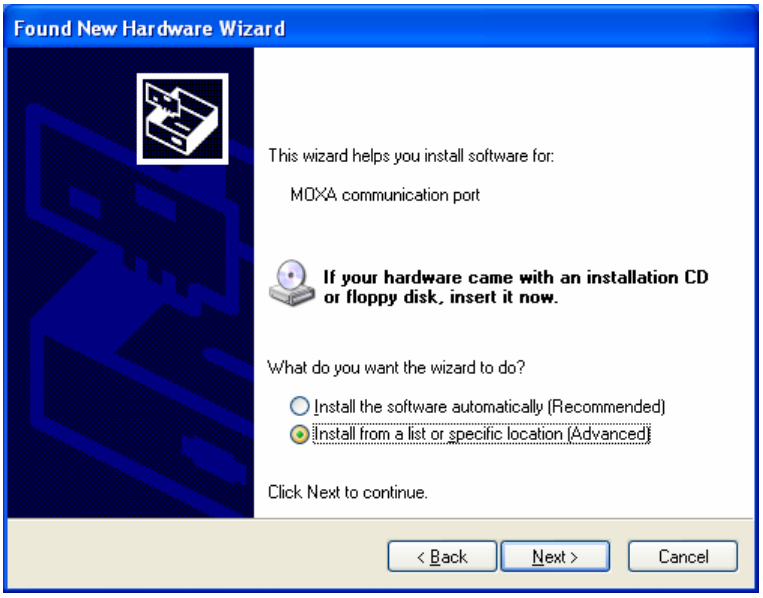

Found New Hardware Wizard
Please wait while the wizard installs the software...
MOXA CB-114 Series (PC/104-Plus)
Setting a system restore point and backing up old files in case your system needs to be restored in the future.
< Back
Next >
Cancel


Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
MOXA CB-114 Series (PC/104-Plus)
Click Finish to close the wizard.
< Back
Finish
Cancel

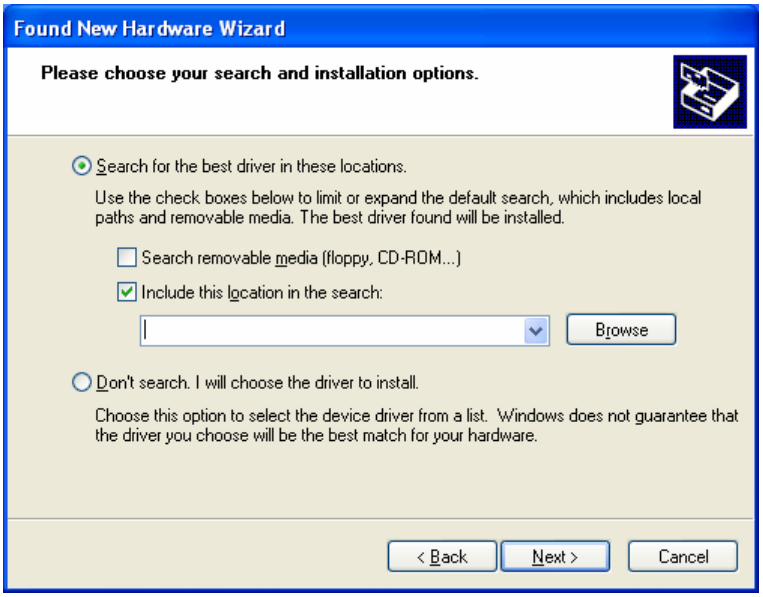
7. After the module is installed, you will be prompted to install the new serial ports. A **Found New Hardware Wizard** window will open for the first serial port, port 0. Select **No, not this time** and click **Next**.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).
Read our privacy policy
Can Windows connect to Windows Update to search for software?
Yes, this time only
Yes, now and every time I connect a device
No, not this time
Click Next to continue.
< Back
Next >
Cancel

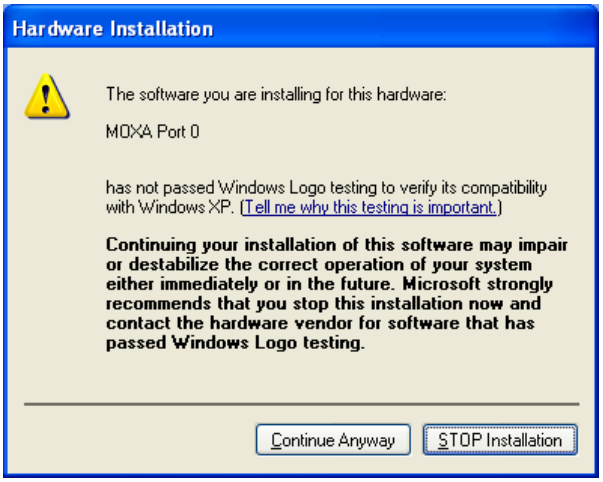
8. Select **Install from a list or specific location (Advanced)** and click **Next**.


Found New Hardware Wizard
This wizard helps you install software for:
MOXA communication port
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

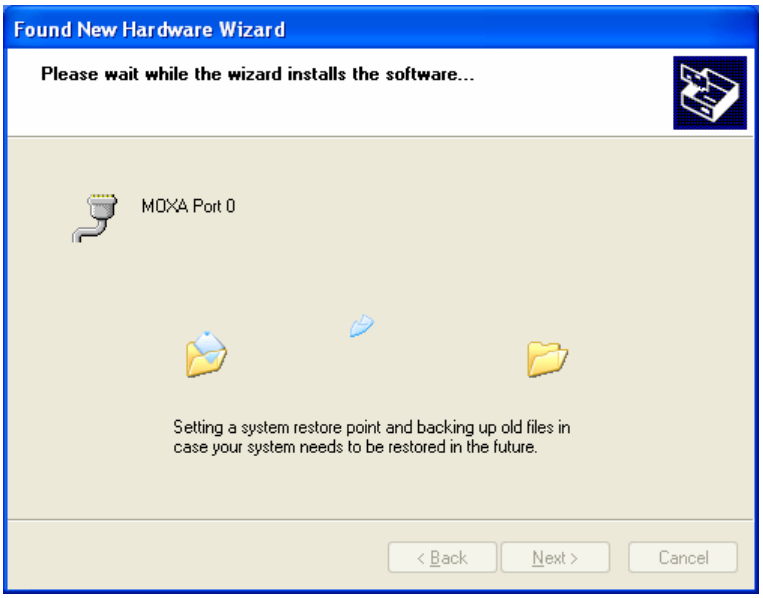
9. Select **Search for the best driver in these locations** and **Include this location in the search**. For 32-bit (x86) platforms, select the **\CB Series\Software\Windows XP_2003\x86** folder on the CD. For 64-bit (x64) platforms, select the **\CB Series\Software\Windows XP_2003\x64** folder on the CD. Click **Next** to continue.


Found New Hardware Wizard
Please choose your search and installation options.
Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM...)
Include this location in the search:
Browse
Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< Back
Next >
Cancel

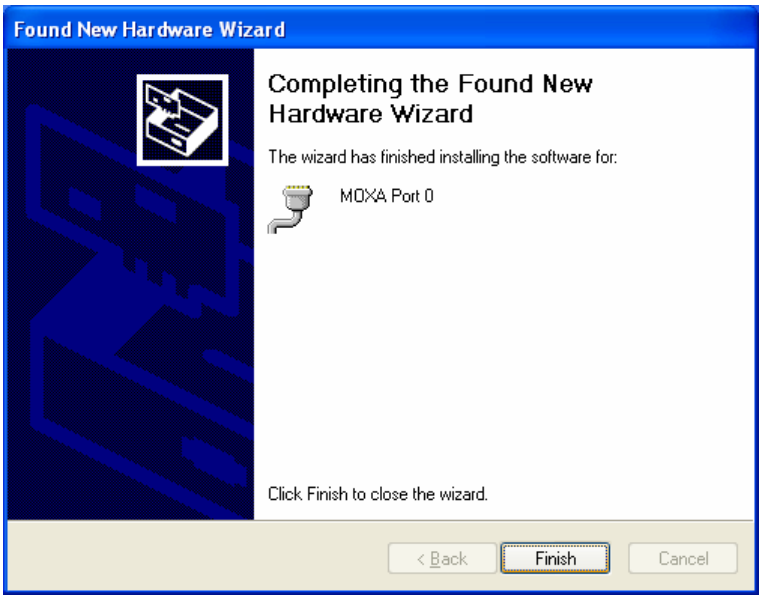
10. If you see a warning that the software has not passed Windows Logo testing, click **Continue Anyway**.


Hardware Installation
The software you are installing for this hardware:
MOXA Port 0
has not passed Windows Logo testing to verify its compatibility with Windows XP. (Tell me why this testing is important.)
Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
Continue Anyway
STOP Installation

11. Windows will install the necessary drivers.


Found New Hardware Wizard
Please wait while the wizard installs the software...
MOXA Port 0
Setting a system restore point and backing up old files in case your system needs to be restored in the future.
< Back
Next >
Cancel

12. After the installation is complete, click **Finish**.

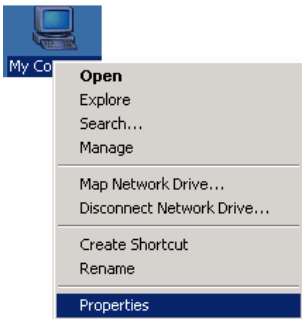


13. Repeat the installation process for the remaining serial ports.

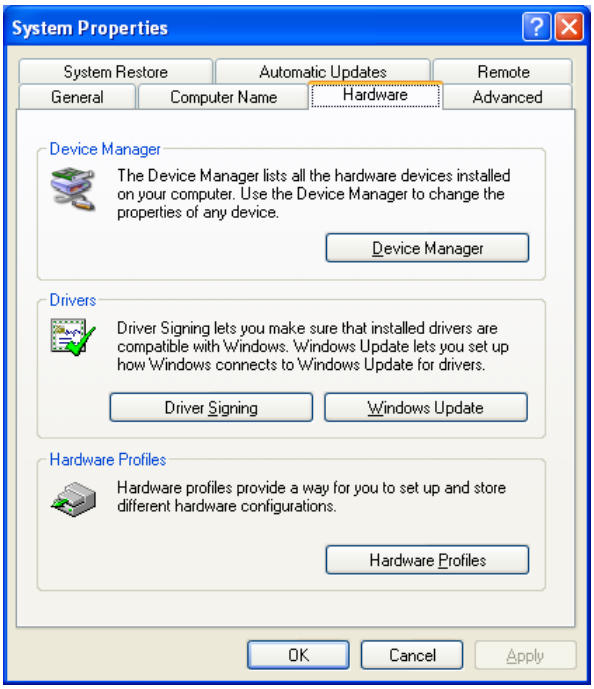
Using Device Manager to Verify Installation

You can use Windows Device Manager to verify proper installation of the CB Series module. In the following instructions, the CB-114 is used as an example.

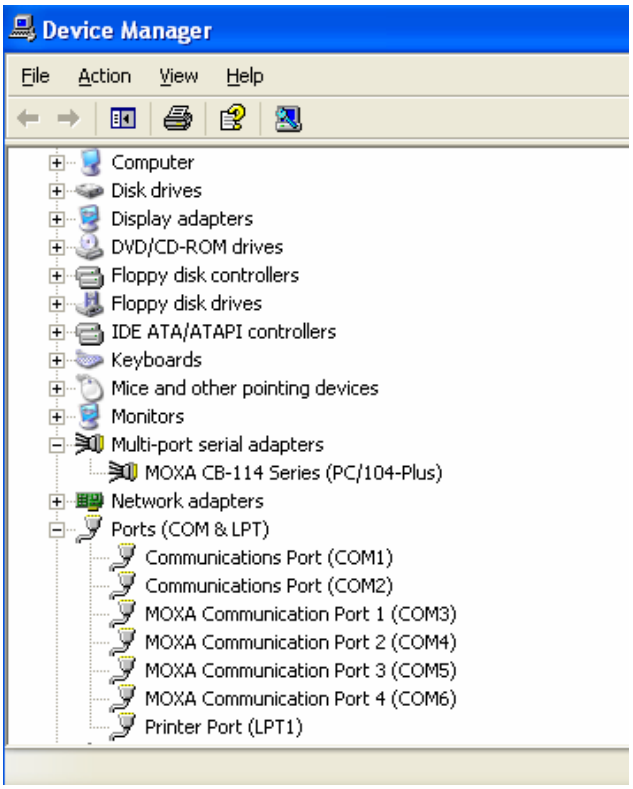
1. Right-click **My Computer** and select **Properties** in the context menu.



2. In the **Hardware** tab, click **Device Manager**.


System Properties
System Restore
Automatic Updates
Remote
General
Computer Name
Hardware
Advanced
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Device Manager
Drivers
Driver Signing lets you make sure that installed drivers are compatible with Windows. Windows Update lets you set up how Windows connects to Windows Update for drivers.
Driver Signing
Windows Update
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles
OK
Cancel
Apply

3. In the **Device Manager** window, you should see your CB Series module under M**ulti-port serial adapters**. You should also see MOXA communication ports under **Ports (COM & LPT)**.

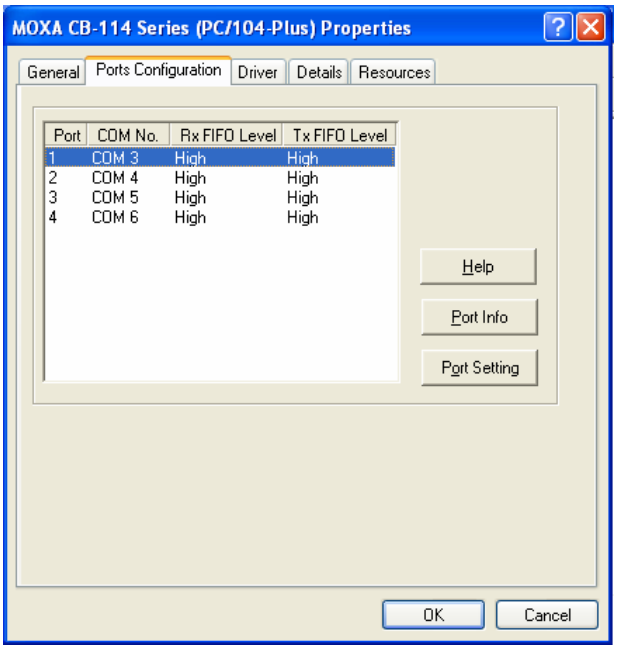


4. If you see any special marks, such as a question mark or an exclamation mark, next to the MOXA items, the installation of your module or serial ports was not successful. Examine the Windows event log for details.

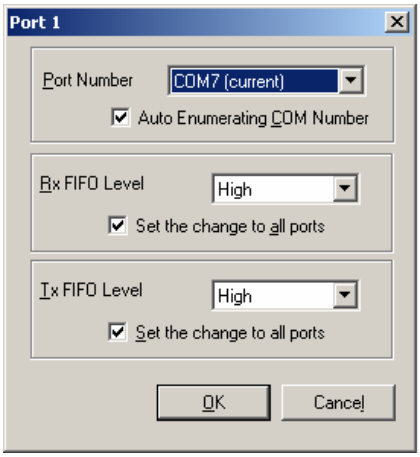
Port Configuration

After the driver is installed, a CB Series Properties window will appear. The system will map the serial ports automatically. It will prompt you to take care of port configuration if another CB Series module has been installed on the PC.

1. Select a specific port under the **Port Configuration** tab and click **Port Setting.**



2. Under **Port Number**, select a COM number to assign to the serial port.



Select **Auto Enumerating COM Number** to map subsequent ports in numerical order. For example, if COM 3 is assigned to Port 1, then COM 4 will be automatically assigned to Port 2.

	Tx FIFO	Rx FIFO
High	128 bytes	120 bytes
Middle	64 bytes	60 bytes
Low	1 byte	1 byte

Select an **Rx FIFO Trigger.** The default value is 120 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.

Select a **Tx FIFO Size**. The default value is 128 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.

3. Click **OK** to approve the port settings. Click **OK** again to close the **CB Series Properties** window and apply the new port settings.

Using PComm

PComm Diagnostic is a useful program for checking the module's status. It provides internal and external testing of IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, and other items. You can use PComm Diagnostic to verify that the module and serial ports are working properly.

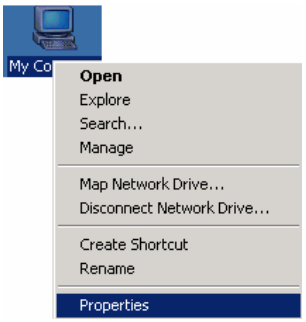
You can download the free version of PComm at Moxa's website (www.moxa.com).

Using Event Log

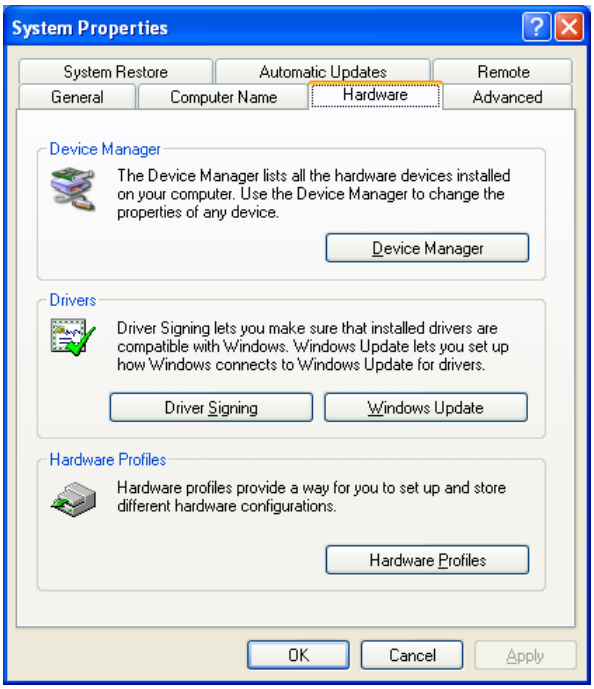
You may refer to the Windows event log to verify operation of the module. To view the event log, open Event Viewer, which is located under Administrative Tools in the Control Panel. Information about the module will be located under the System category.

Disabling the Module

1. Right-click **My Computer** and select **Properties** in the context menu.



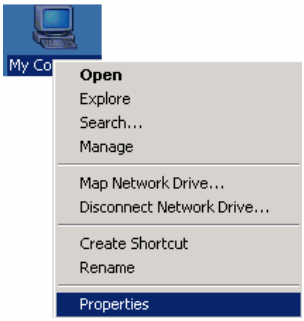
2. In the **Hardware** tab, click **Device Manager**.


System Properties
System Restore
Automatic Updates
Remote
General
Computer Name
Hardware
Advanced
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Device Manager
Drivers
Driver Signing lets you make sure that installed drivers are compatible with Windows. Windows Update lets you set up how Windows connects to Windows Update for drivers.
Driver Signing
Windows Update
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles
OK
Cancel
Apply

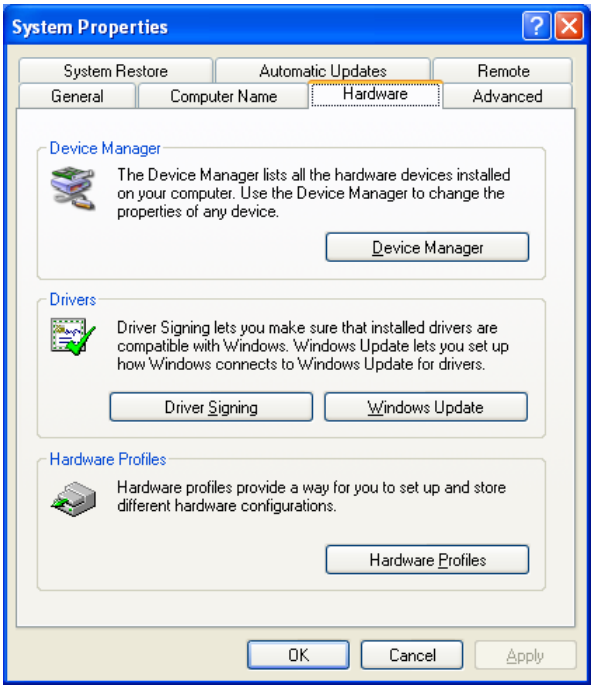
3. In **Device Manager**, right-click your module under **Multi-port serial adapters** and select **Disable** in the context menu. This will disable the module.

Uninstalling the Module

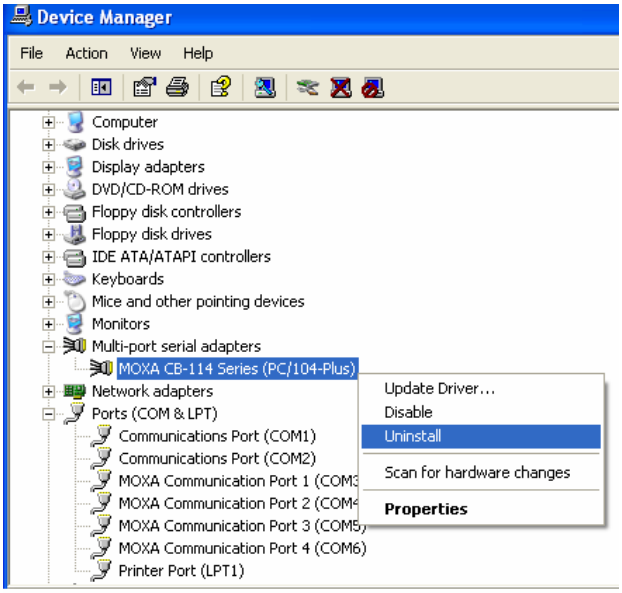
1. Right-click **My Computer** and select **Properties** in the context menu.



2. In the **Hardware** tab, click **Device Manager**.


System Properties
System Restore
Automatic Updates
Remote
General
Computer Name
Hardware
Advanced
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Device Manager
Drivers
Driver Signing lets you make sure that installed drivers are compatible with Windows. Windows Update lets you set up how Windows connects to Windows Update for drivers.
Driver Signing
Windows Update
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles
OK
Cancel
Apply

3. Right-click your module under **Multi-port serial adapters** and select **Uninstall** in the context menu.



4. A confirmation dialog will appear. Click **OK** to uninstall the device.

Windows 2000

The Windows 2000 drivers conform to the Win32 COMM API standard and support all models in the CB Series. In the following instructions, the CB-114 is used as an example.

Installing the Driver

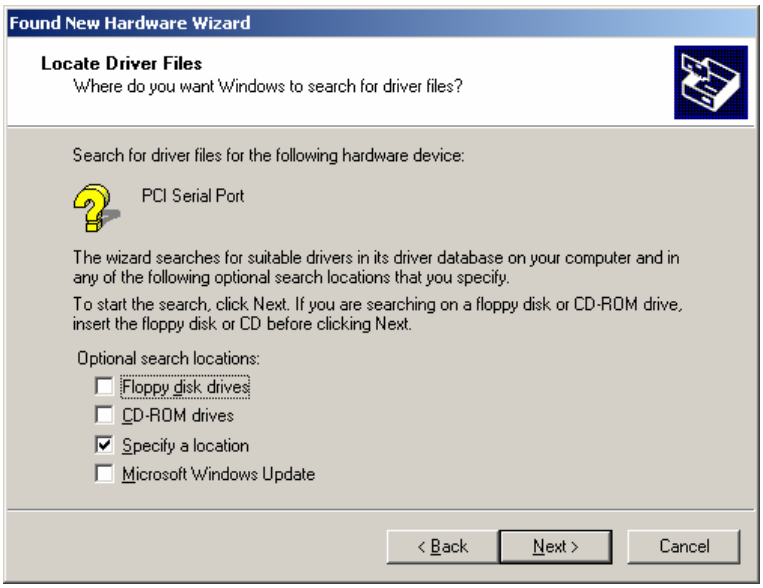
1. After the module has been plugged into a PC/104-*Plus* slot, turn the embedded computer on.
2. Windows will automatically detect the new module and the **Found New Hardware Wizard** will open automatically. Click **Next** to continue.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device.
To continue, click Next.
< Back
Next >
Cancel

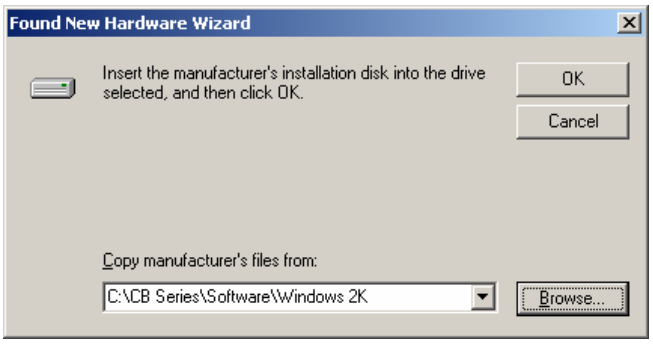
3. Select **Search for a suitable driver for my device (recommended)** and click **Next** to continue.

Found New Hardware Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard will complete the installation for this device:
PCI Serial Port
A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel

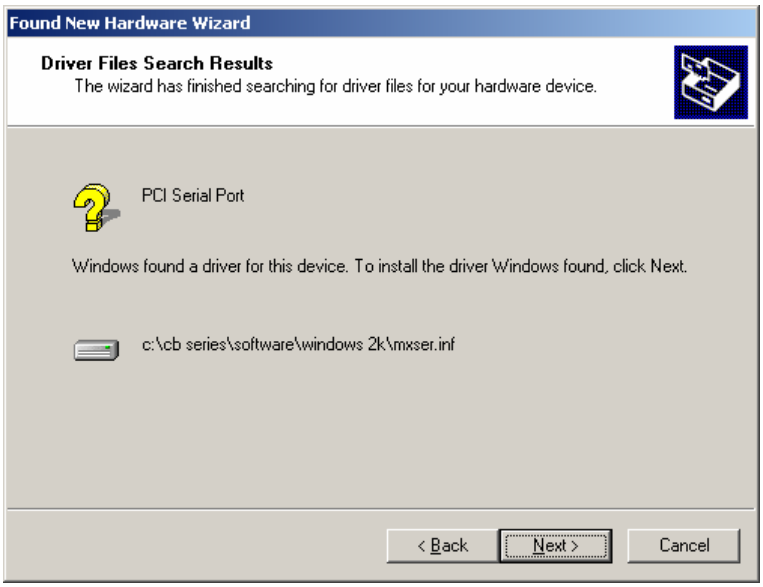
4. Select **Specify a location** and click **Next** to continue.


Found New Hardware Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
PCI Serial Port
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel

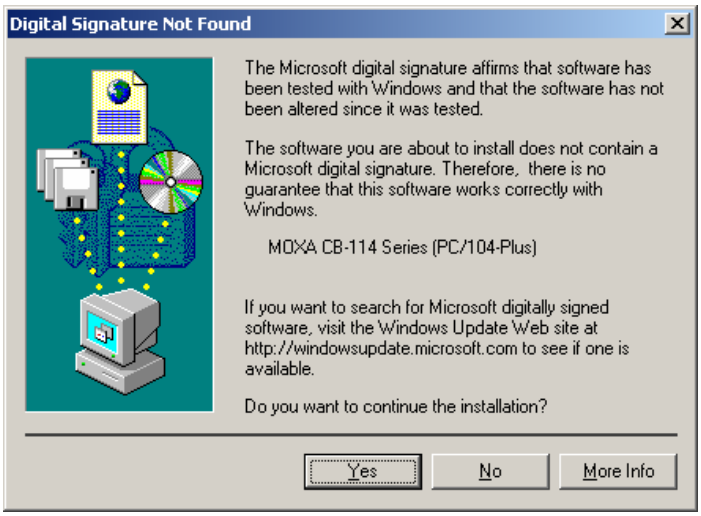
5. Click **Browse** to manually specify the folder in which to find the driver. Select the **\CB Series\Software\Windows 2K** folder on the CD and click **Next** to continue.



6. To begin installing the module, click **Next**.


Found New Hardware Wizard
Driver Files Search Results
The wizard has finished searching for driver files for your hardware device.
PCI Serial Port
Windows found a driver for this device. To install the driver Windows found, click Next.
c:\cb series\software\windows 2k\mxser.inf
< Back
Next >
Cancel

7. If you see a warning that the Microsoft digital signature was not found, click **Yes** to proceed with the installation.


Digital Signature Not Found
The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.
MOXA CB-114 Series (PC/104-Plus)
If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.
Do you want to continue the installation?
Yes
No
More Info

8. Windows will install the drivers. When the installation is complete, click **Finish**.

Found New Hardware Wizard
Completing the Found New Hardware Wizard
MOXA CB-114 Series (PC/104-Plus)
Windows has finished installing the software for this device.
To close this wizard, click Finish.
< Back
Finish
Cancel

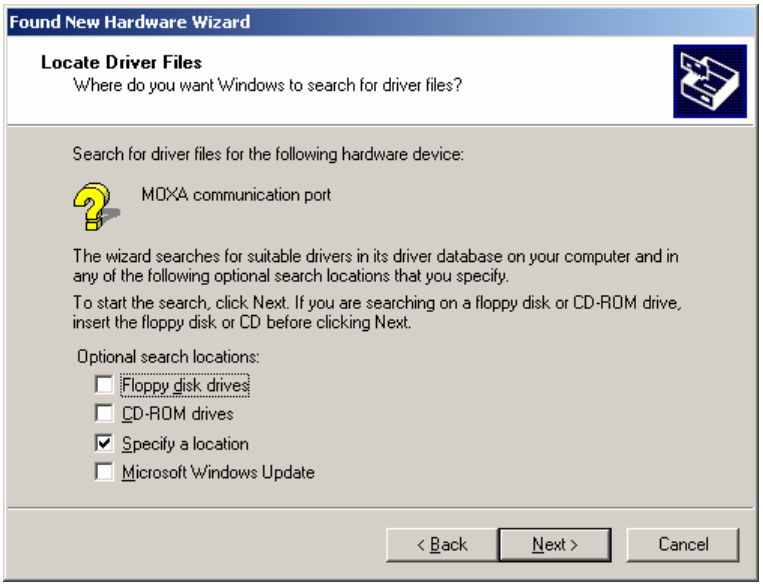
9. After the module is installed, you will be prompted to install the new serial ports. A **Found New Hardware Wizard** window will open for the first serial port, port 0. Click **Next** to proceed.

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install a device driver for a hardware device.
To continue, click Next.
< Back
Next >
Cancel

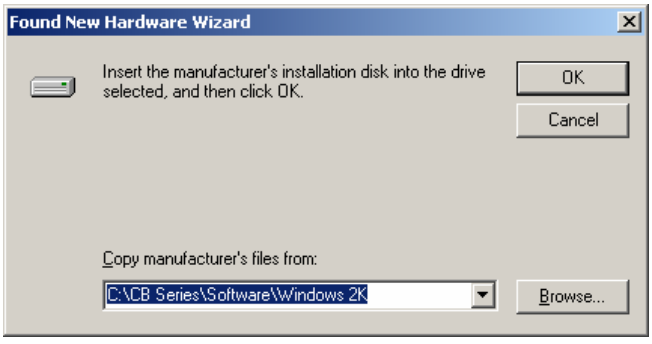
10. Select **Search for a suitable driver for my device [recommended]** and click **Next**.

Found New Hardware Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard will complete the installation for this device:
MOXA communication port
A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.
What do you want the wizard to do?
Search for a suitable driver for my device [recommended]
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel

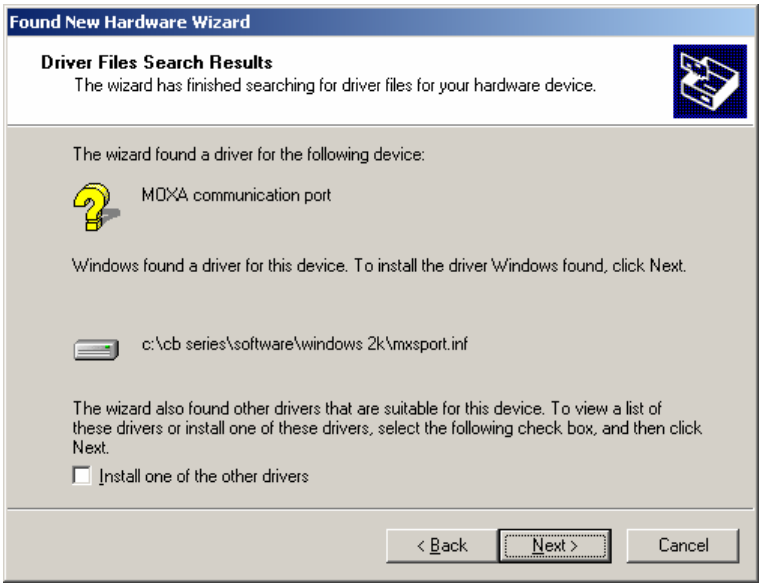
11. Select **Specify a location** and click **Next**.


Found New Hardware Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
MOXA communication port
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel

12. Select the **\CB Series\Software\Windows 2K** folder on the CD and click **Next**.



13. When the driver has been found, click **Next** to proceed.


Found New Hardware Wizard
Driver Files Search Results
The wizard has finished searching for driver files for your hardware device.
The wizard found a driver for the following device:
MOXA communication port
Windows found a driver for this device. To install the driver Windows found, click Next.
c:\cb series\software\windows 2k\mxsport.inf
The wizard also found other drivers that are suitable for this device. To view a list of these drivers or install one of these drivers, select the following check box, and then click Next.
Install one of the other drivers
< Back
Next >
Cancel

14. Windows will install the necessary drivers. After the installation is complete, click **Finish**.

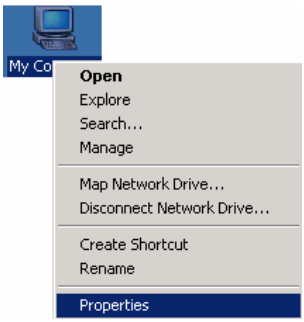
Found New Hardware Wizard
Completing the Found New Hardware Wizard
MOXA Port 0
Windows has finished installing the software for this device.
To close this wizard, click Finish.
< Back
Finish
Cancel

The remaining serial ports will be installed automatically in the background.

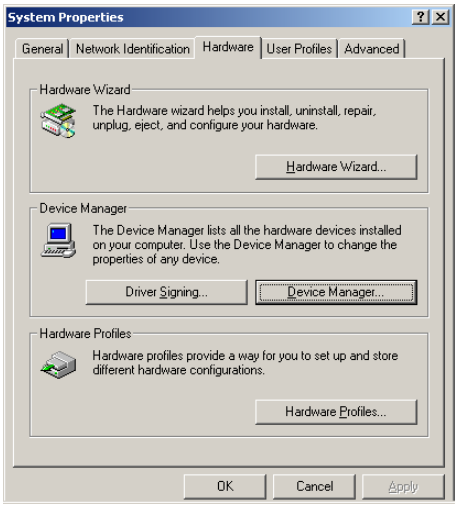
Using Device Manager to Verify Installation

You can use Windows Device Manager to verify proper installation of the CB Series module. In the following instructions, the CB-114 is used as an example.

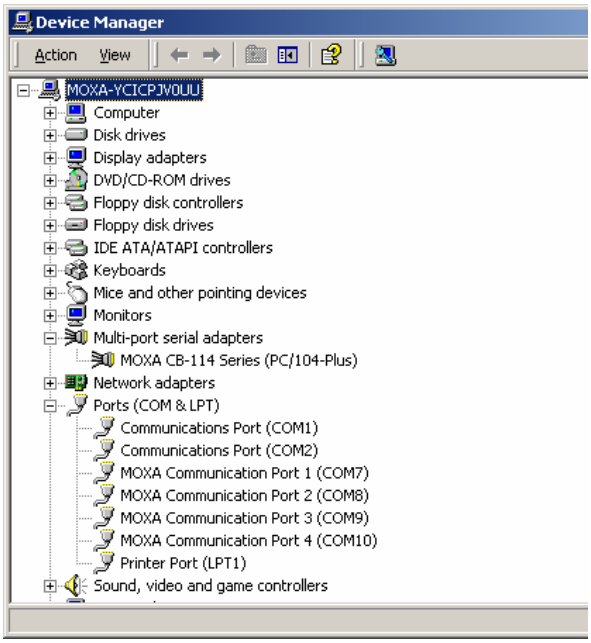
1. Right-click **My Computer** and select **Properties** in the context menu.



2. In the **Hardware** tab, click **Device Manager**.


System Properties
General
Network Identification
Hardware
User Profiles
Advanced
Hardware Wizard
The Hardware wizard helps you install, uninstall, repair, unplug, eject, and configure your hardware.
Hardware Wizard...
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Driver Signing...
Device Manager...
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles...
OK
Cancel
Apply

3. In the **Device Manager** window, you should see your CB Series module under M**ulti-port serial adapters**. You should also see MOXA communication ports under **Ports (COM & LPT)**.

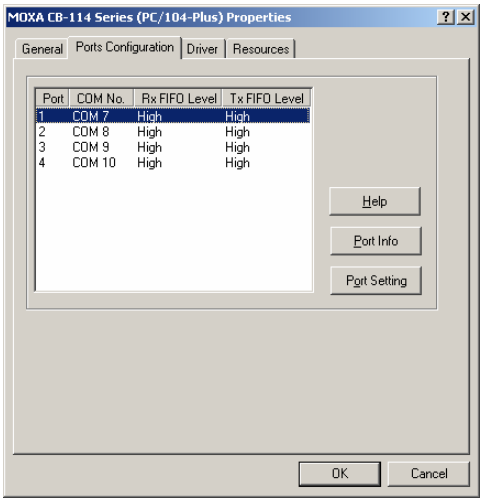


4. If you see any special marks, such as a question mark or an exclamation mark, next to the MOXA items, the installation of your module or serial ports was not successful. You can check the Windows event log for details.

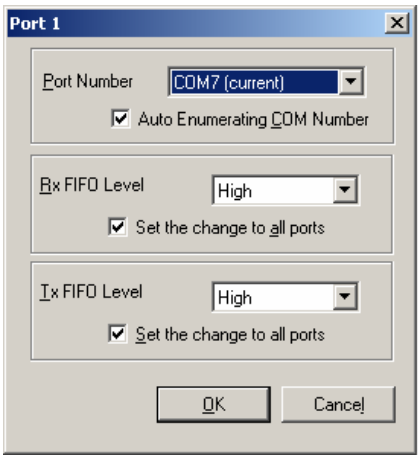
Port Configuration

After the driver is installed, a CB Series Properties window will appear. The system will map the serial ports automatically. It will prompt you to take care of port configuration if another CB Series module has been installed on the PC.

1. Select a specific port under the **Port Configuration** tab and click **Port Setting.**



2. Under **Port Number**, select a COM number to assign to the serial port.



Select **Auto Enumerating COM Number** to map subsequent ports in numerical order. For example, if COM 3 is assigned to Port 1, then COM 4 will be automatically assigned to Port 2.

	Tx FIFO	Rx FIFO
High	128 bytes	120 bytes
Middle	64 bytes	60 bytes
Low	1 byte	1 byte

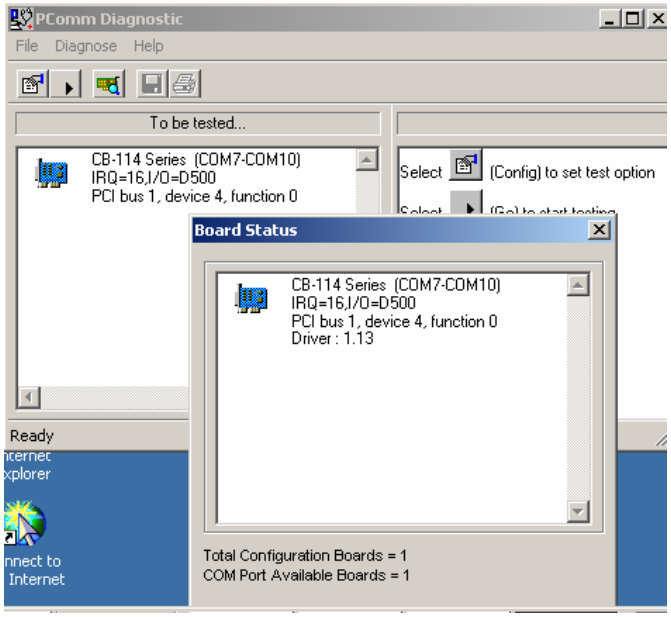
Select an **Rx FIFO Trigger.** The default value is 120 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.

Select a **Tx FIFO Size**. The default value is 128 bytes (high level). Select **Set the change to all ports** to use this setting for all serial ports on the module.

3. Click **OK** to approve the port settings. Click **OK** again to close the **CB Series Properties** window and apply the new port settings.

Using PComm

PComm Diagnostic is a useful program for checking the module's status. It provides internal and external testing of IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, and other items. You can use PComm Diagnostic to verify that the module and serial ports are working properly.



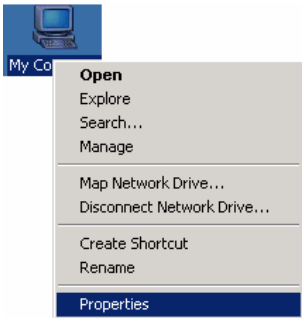
The free version of PComm is available at Moxa's website (www.moxa.com).

Using Event Log

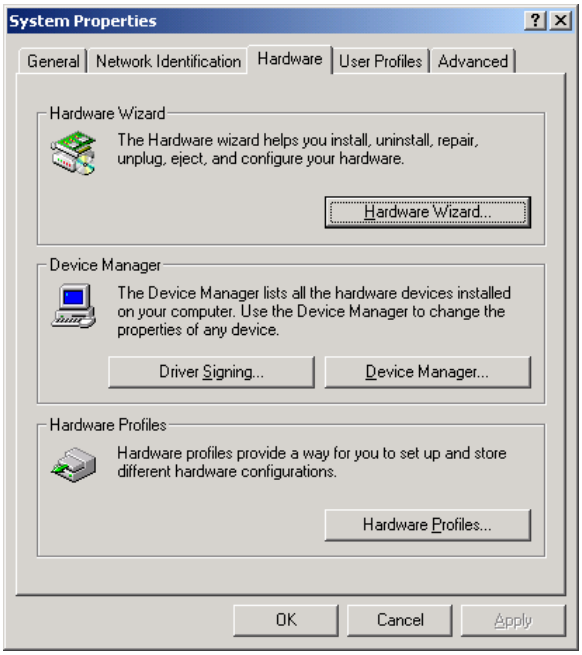
You may refer to the Windows event log to verify operation of the module. To view the event log, open Event Viewer, which is located under Administrative Tools in the Control Panel. Information about the module will be located under the System category.

Disabling the Module

1. Right-click **My Computer** and select **Properties** in the context menu.



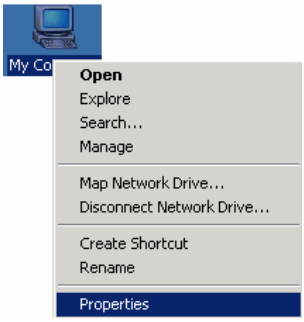
2. In the **Hardware** tab, click **Device Manager**.


System Properties
General
Network Identification
Hardware
User Profiles
Advanced
Hardware Wizard
The Hardware wizard helps you install, uninstall, repair, unplug, eject, and configure your hardware.
Hardware Wizard...
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Driver Signing...
Device Manager...
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles...
OK
Cancel
Apply

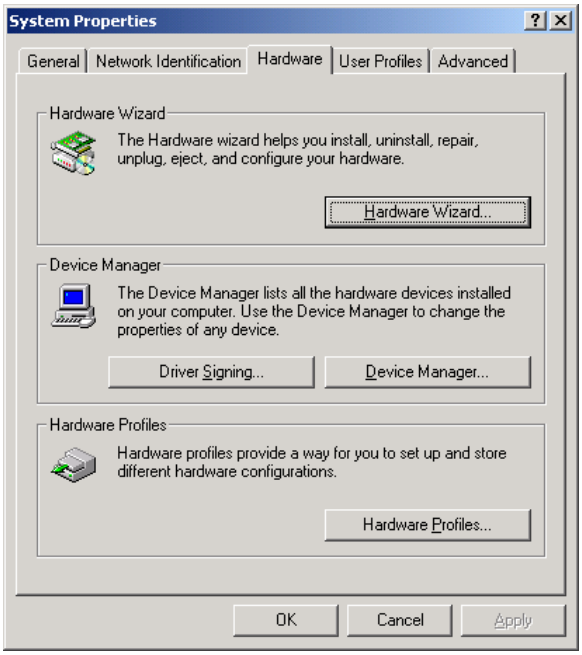
3. In **Device Manager**, right-click your module under **Multi-port serial adapters** and select **Disable** in the context menu. This will disable the module.

Uninstalling the Module

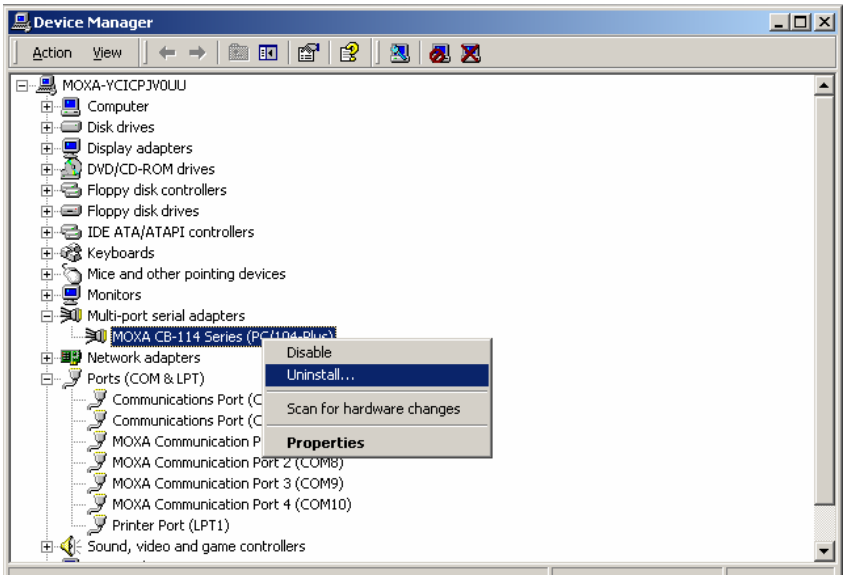
1. Right-click **My Computer** and select **Properties** in the context menu.



2. In the **Hardware** tab, click **Device Manager**.


System Properties
General
Network Identification
Hardware
User Profiles
Advanced
Hardware Wizard
The Hardware wizard helps you install, uninstall, repair, unplug, eject, and configure your hardware.
Hardware Wizard...
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Driver Signing...
Device Manager...
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles...
OK
Cancel
Apply

3. Right-click your module under **Multi-port serial adapters** and select **Uninstall** in the context menu.



4. A confirmation dialog will appear. Click **OK** to uninstall the device.

Linux (32-bit and 64-bit)

Execute the following commands from the Linux prompt:

```
#mount /dev/cdrom /mnt/cdrom
#cd /
#mkdir moxa
#cd moxa
#cp /mnt/cdrom/<driver directory>/mxser.tgz .
#tar xvfz mxser.tgz

#cd mxser
# make clean; make install

#cd /moxa/mxser/driver
#./msmknod

#modprobe mxser
```

You can use the Moxa diagnostic utility to verify the driver status:

```
#cd /moxa/mxser/utility/diag
#./msdiag
```

You can use the Moxa terminal utility to test the tty ports:

```
#cd /moxa/mxser/utility/term
#./msterm
```

DOS

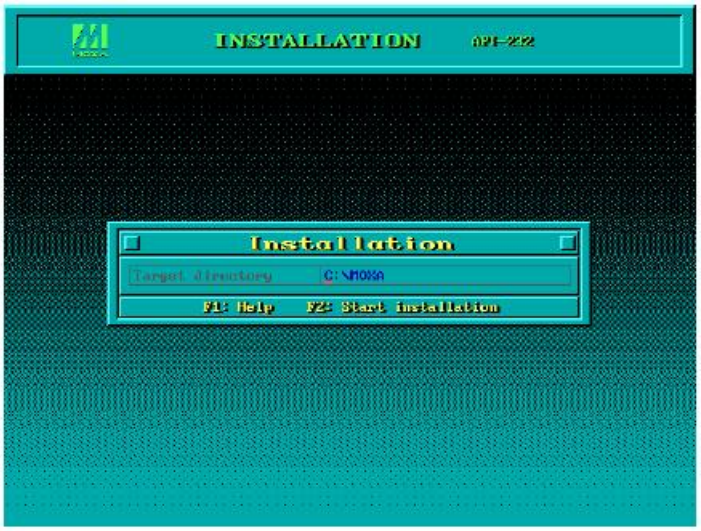
MOXA DOS API-232 is a software package that can help you develop or debug serial communications programs. This section will explain how to install the package, set up the driver, and load or unload the driver. For additional information about the API-232 library and utilities, please refer to Chapter 4.

The DOS drivers support all models in the CB Series.

In the following instructions, the CB-104 is used as an example.

Installing the Driver

Run the installation program, **DOSINST.EXE**, in the DOS folder. Specify the target directory for the API-232 files (e.g., **C:\MOXA**). Press **F2** to start the installation.



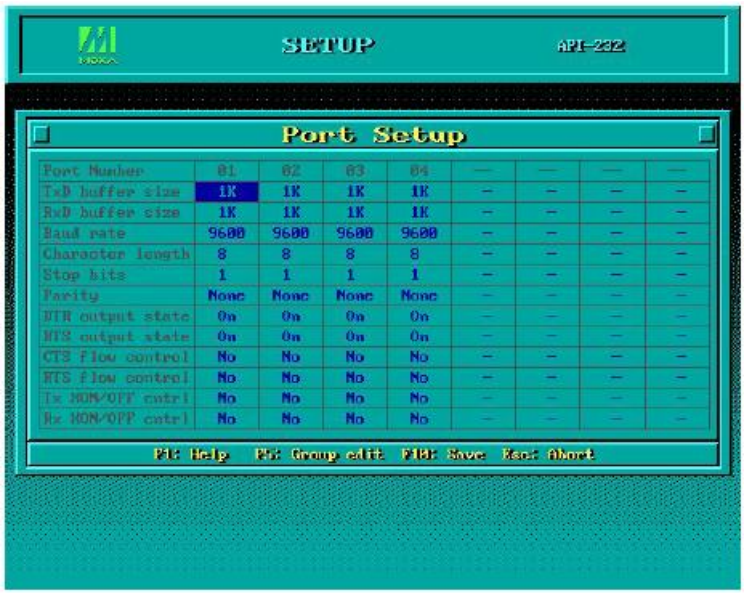
After installation is complete, you will be prompted to set up the board and driver initial values. We strongly recommended that you do so.

INSTALLATION
Installation complete. 57 files copied.
After leaving this program, you have to run
C:\MOXA\BIN\SETUP.EXE
program to setup board & driver initial values.
Do you want to run SETUP.EXE now ?(Y/N)

Driver Setup

The following instructions are not intended to illustrate every function of the setup program. For more detailed information, please refer to the help files by pressing F1 in the setup program.

1. Run the setup program, **BIN\SETUP.EXE**.
2. Select your CB Series model and press **Enter**.
3. A window will open displaying all configuration information for all installed modules. Press **PgDn** to view advanced port setup options and to make configuration changes. Your module's configuration will be displayed along with other settings such as port number, buffer size, etc.
4. Verify the settings and make any necessary changes.

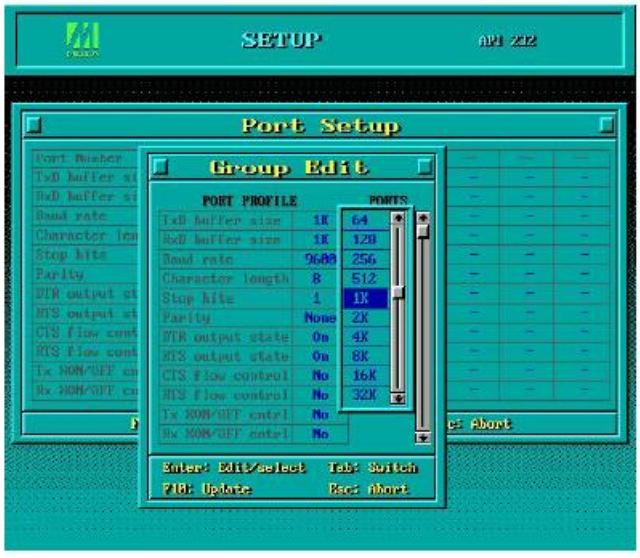

SETUP
API-232
Port Setup
Port Number 01 02 03 04
TxD buffer size 1K 1K 1K 1K
RxD buffer size 1K 1K 1K 1K
Baud rate 9600 9600 9600 9600
Character length 8 8 8 8
Stop bits 1 1 1 1
Parity None None None None
DTR output state On On On On
RTS output state On On On On
CTS flow control No No No No
RTS flow control No No No No
Tx XON/OFF ctrl No No No No
Rx XON/OFF ctrl No No No No
F1: Help F5: Group edit F10: Save Esc: Abort

Port number: This is the port ID of each port. Application software will refer to a port by its port number (ID). Port numbers must be unique; duplicate port numbers are not allowed. The port ID can range from 0 to 127 as long as it does not overlap with another port. Generally, you should consider the convenience of programming when specifying the port number.

TxD buffer size: This is the transmission (output) buffer allocated in the system for each port.

RxD buffer size: This is the receiving (input) buffer allocated in the system for each port.

F5: Group Edit: This allows you to configure several ports simultaneously as a group.



5. Press **F10** to save the latest configuration and exit the setup program.

Loading the Driver

After setting up the driver, you must load the driver in order to gain access to the serial ports on the module. Run **BIN\DPC-DRV.EXE** at the DOS prompt. The driver will detect your CB Series module automatically. You should see messages indicating successful detection of your module, such as the following:

```
Smartio/Industio Family DOS driver Version 1.8
Setup driver …
CB-114 series (Bus=x, Dev=y) : OK!
Device driver setup O.K.
```

At this point, you can execute applications that support API-232 functions, or start developing applications using the API-232 library.

Unloading the Driver

To unload or release the CB Series driver from memory, enter **DPC-DRV/Q** at the DOS prompt.

Windows CE 5.0

In this section, we explain how to install Moxa CB series boards under WinCE 5.0. These instructions are intended for users who are familiar with the Windows CE Platform Builder 5.0 Toolkit, and would like to install one or more Moxa Tech products. Here, we only give the step-by-step installation instructions for the development environment. You will need to download the image file to the target host yourself.

The WinCE 5.0 driver for the MOXA CB Series PC/104-Plus Multiport Serial Module supports the following products:

- CB Series: CB-108, CB-114, CB-134I

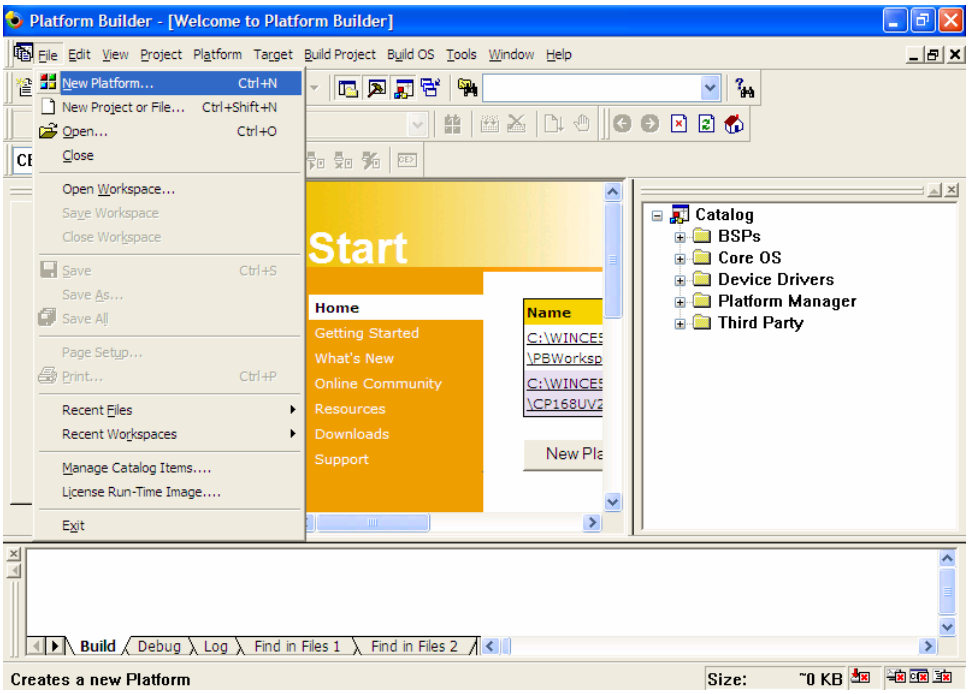
The CB-114 board is used to illustrate the installation procedure.

Installing the driver

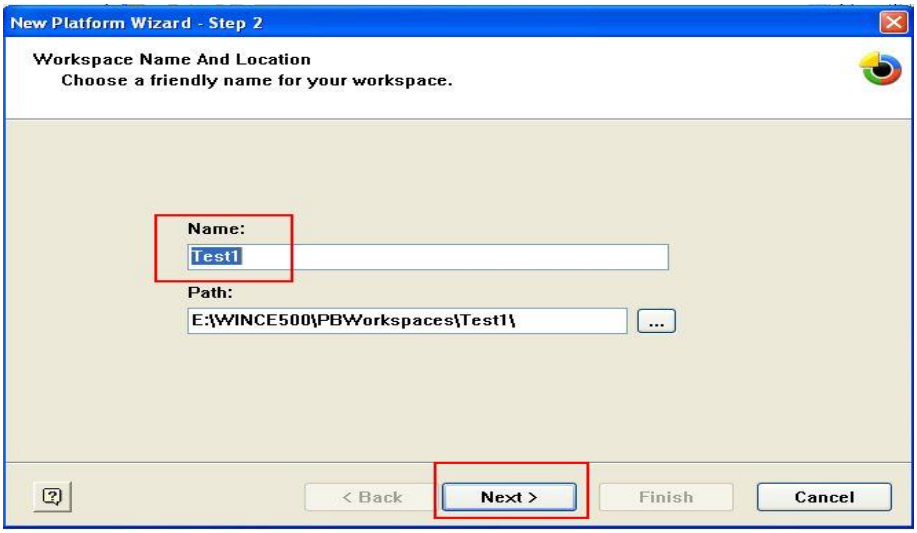
The following procedure explains how to install the CB-114 multiport serial module driver under WinCE.

1. Obtain a copy of MOXA Tech WinCE 5.0 driver package and extract it to your computer. Double click the Install package to copy the **Mxser** folder to %WINCEROOT%\PLATFORM\ automatically, and import the supported MOXA Tech products into the **Folder**.

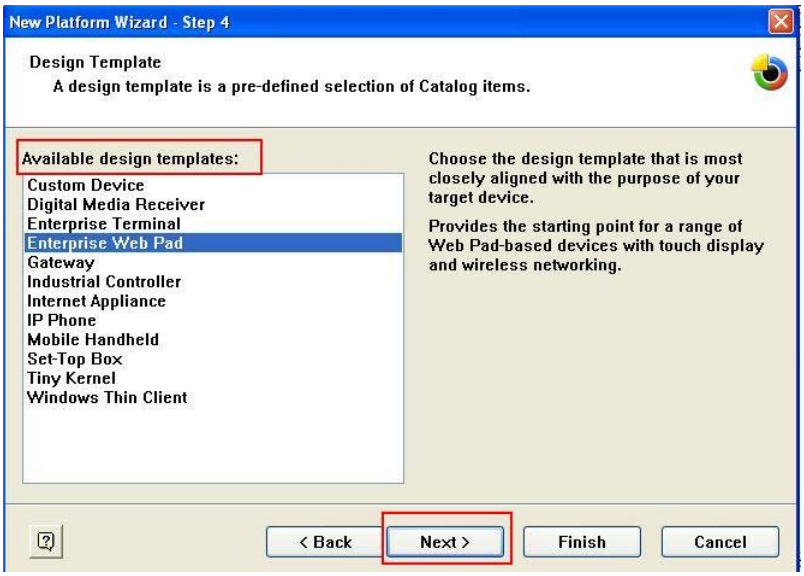
2. Start WinCE Platform Builder, select **File**, and open **New Platform**.

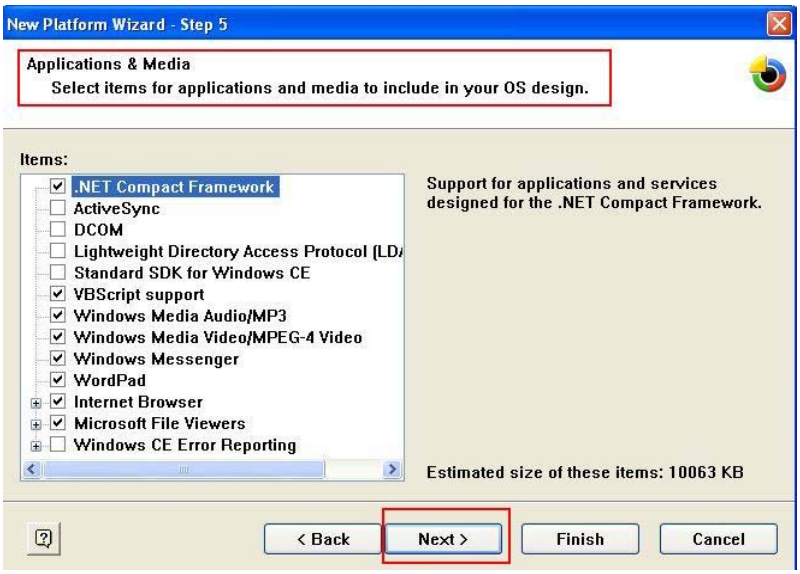


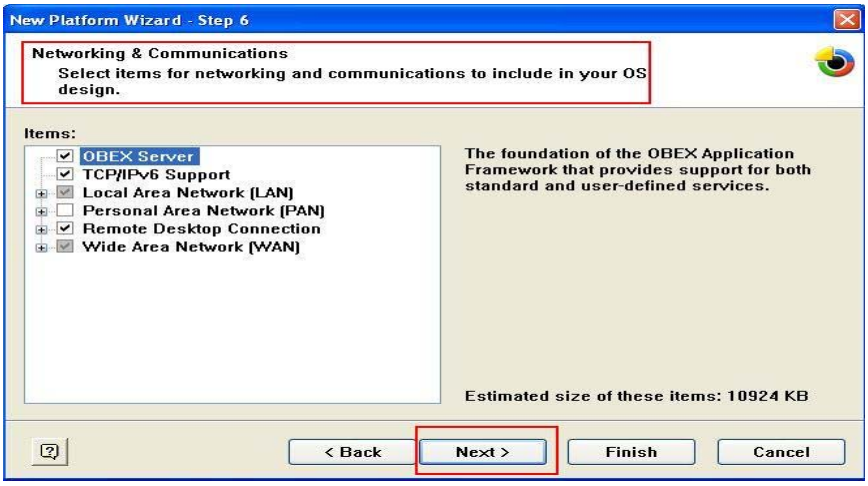
3. Enter a Name for Workspace and press **Next**.

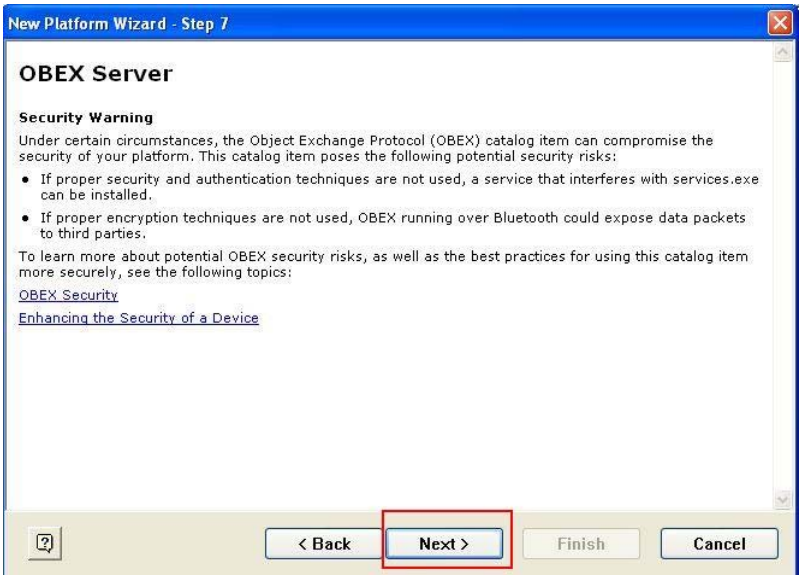


4. When you see **Board Support Packages, Design Template, Applications & Media, Networking & Communications, OBEX Server**, select what you need to build your own environment. The **Completing the New Platform Wizard** window will open to indicate that it has finished creating a new platform. Click **Finish** to complete the setup.


New Platform Wizard - Step 4
Design Template
A design template is a pre-defined selection of Catalog items.
Available design templates:
Custom Device
Digital Media Receiver
Enterprise Terminal
Enterprise Web Pad
Gateway
Industrial Controller
Internet Appliance
IP Phone
Mobile Handheld
Set-Top Box
Tiny Kernel
Windows Thin Client
Choose the design template that is most closely aligned with the purpose of your target device.
Provides the starting point for a range of Web Pad-based devices with touch display and wireless networking.
< Back
Next >
Finish
Cancel




New Platform Wizard - Step 6
Networking & Communications
Select items for networking and communications to include in your OS design.
Items:
OBEX Server
TCP/IPv6 Support
Local Area Network (LAN)
Personal Area Network (PAN)
Remote Desktop Connection
Wide Area Network (WAN)
The foundation of the OBEX Application Framework that provides support for both standard and user-defined services.
Estimated size of these items: 10924 KB
< Back
Next >
Finish
Cancel

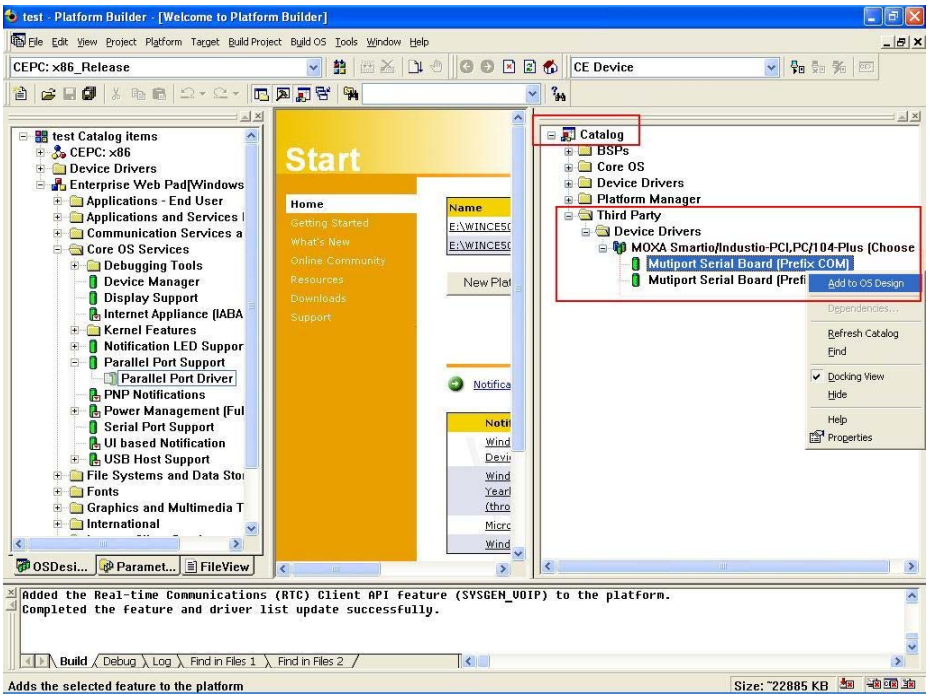

New Platform Wizard - Step 7
OBEX Server
Security Warning
Under certain circumstances, the Object Exchange Protocol (OBEX) catalog item can compromise the security of your platform. This catalog item poses the following potential security risks:
If proper security and authentication techniques are not used, a service that interferes with services.exe can be installed.
If proper encryption techniques are not used, OBEX running over Bluetooth could expose data packets to third parties.
To learn more about potential OBEX security risks, as well as the best practices for using this catalog item more securely, see the following topics:
OBEX Security
Enhancing the Security of a Device
< Back
Next >
Finish
Cancel

New Platform Wizard - Step 8
Completing the New Platform Wizard
You have successfully completed the New Platform Wizard.
You have created an OS design for a Windows CE-based platform. By default, Platform Builder provides a Debug configuration and a Release configuration of this OS design.
Options:
Modify build options for the Debug and Release configurations of your OS design without closing this wizard.
To close this wizard, click Finish.
< Back
Next >
Finish
Cancel

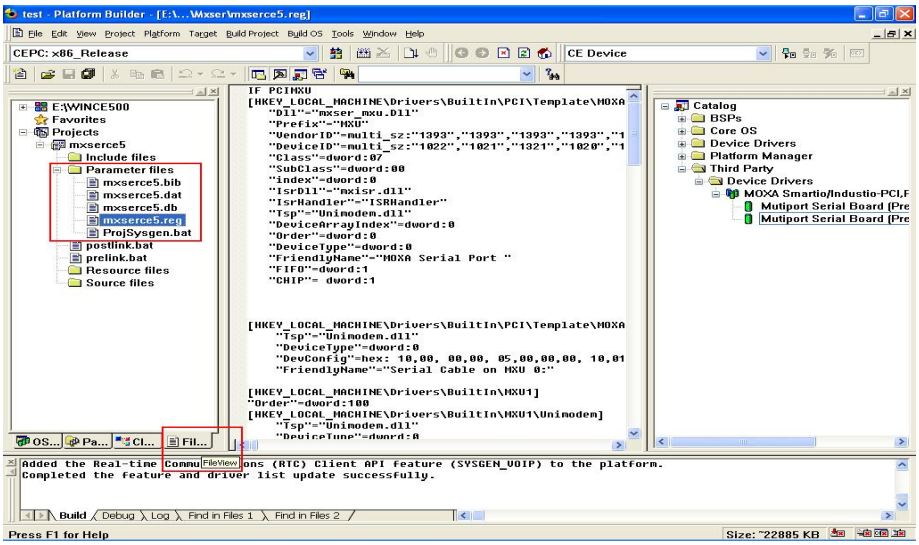
5. Open Manage Catalog Items (**File → Manage Catalog Items**). In the **Catalog** (**View → Catalog**), browse to **\Third Party\Device Drivers\ MOXA Smartio/Industio-PCI, PC/104-Plus**. Right-click on the driver **Prefix COM** or **Prefix MXU** you would like to include and choose Add to **OS Design**.

   Note: You can only select either **Prefix COM** or **Prefix MXU,** but not both.

   Prefix COM supports up to 10 ports, from COM0 to COM9. Prefix MXU supports more than 10 ports, so it is better for you to select Prefix MXU if you are not sure how many ports the device has. Otherwise, you will only be allowed to use one multiport serial board on the target host.



6. After adding MOXA Tech drivers into your **OS Design**, a new project is automatically added to your workspace. The project name is **mxserce5**. The project can be accessed from File View (**View → File View**). The **mxserce5** project contains a number of files used to configure the drivers included in your **OS Design**.



Note: If you would like to use "Terminal Emulator" tool, please modify mxserce5.reg and keyboard like below (This is only just for "one" "COM" port). You have to notice number of ports, COM, MXU and enter the correct information.

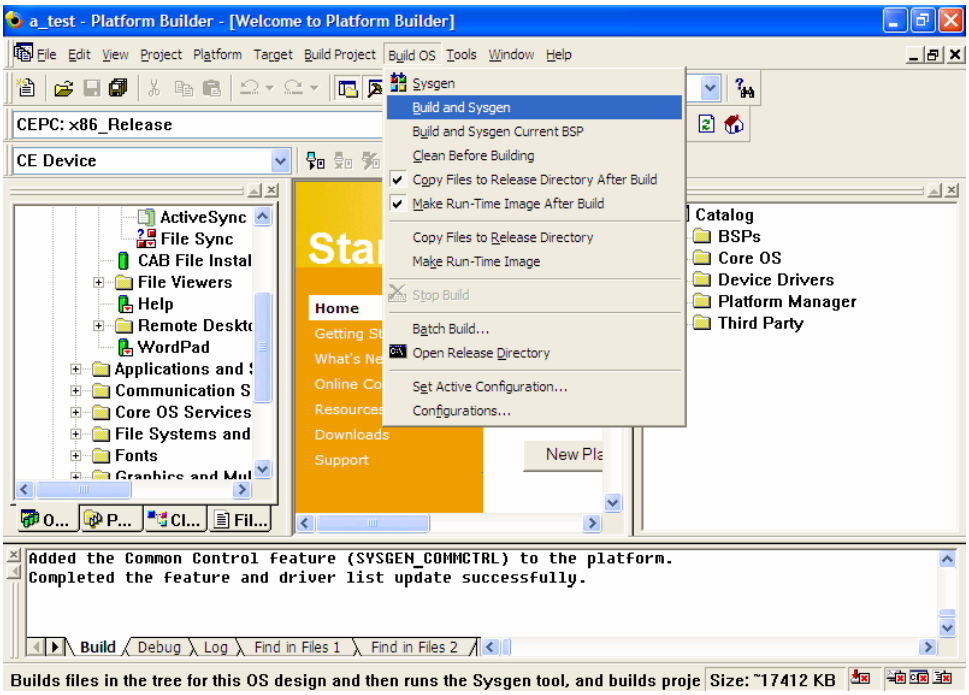
[HKEY_LOCAL_MACHINE\ExtModems\HayesCompat1]

"Port"="COM2:"

"DeviceType"=dword:1

"FriendlyName"="Hayes Compatible on COM2:"

7. Finally, open **Build OS**, select **Build and Sysgen**, and be sure to click **Copy Files to Release Directory After Build** and **Make Run-Time Image After Build**.



8. Finally, copy your image file to the target Host.

Note: If you have created a Windows CE Platform Builder in the development environment, you can skip steps 2, 3, and 4.

4

Serial Programming Tools

MOXA provides Windows serial programming libraries and troubleshooting utilities that are easy to use and powerful. You can use these tools to reduce software development time.

The serial communication library is useful for developing applications for data communications, remote access, data acquisition, and industrial control. It provides a simpler solution compared to the more complex Windows Win32 COMM API.

PComm is a professional serial communication tool for Windows PCs. PComm includes the following features:

- Useful utilities for diagnostics, port monitoring, and terminal emulation
- Sample programs
- Comprehensive help files

The following topics are covered in this chapter:

- **Serial Programming Library**
- **PComm Utilities**
  - Installation
  - PComm Diagnostic
  - PComm Monitor
  - PComm Terminal Emulator

Serial Programming Library

The serial programming library assists you in developing serial communications programs for any COM port that complies with the Microsoft Win32 API. It facilitates the implementation of multi-process and multi-thread serial communication programs and can remarkably reduce development time.

The library provides a complete set of functions as well as various sample programs for Visual C++, Visual Basic, and Delphi. To view detailed descriptions of the available functions and sample programs, go to **Start → Program → PComm Lite** and select **PComm Lib Help**, **PComm Porting Notes**, or **PComm Programming Guide**. You may also refer to the sample programs in the PComm directory.

PComm Utilities

This section provides brief descriptions of the PComm utilities. For more information about these utilities, please refer to the help files or to the API-232.txt file for DOS.

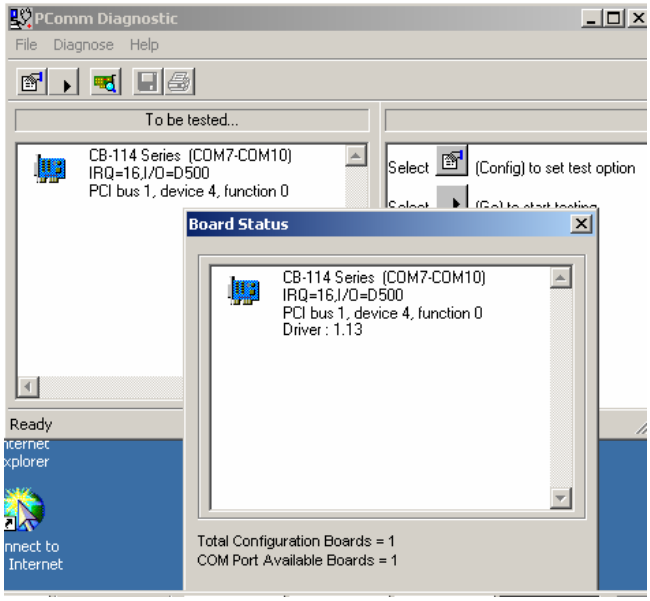
Installation

To install PComm, run **Setup.exe** from the installation diskette. Please note that the PComm diagnostic and monitor utilities are for MOXA boards only. These two utilities will not work with other serial boards.

PComm Diagnostic

PComm Diagnostic is designed for MOXA boards only. It provides internal and external testing of IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, DTR/DCD, and other items. You can use PComm Diagnostic to check the operation of both software and hardware.

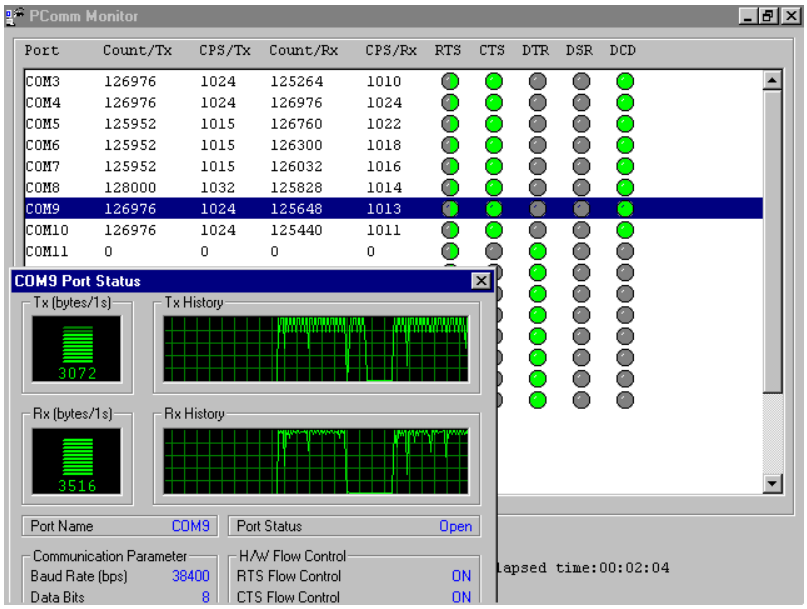
To run the Diagnostic program, go to **Start → Program → PComm Lite → Diagnostic**.



PComm Monitor

PComm Monitor is designed for MOXA board in Windows NT only. It allows you to monitor data transmission of selected MOXA COM ports. It monitors data transmission, throughput, and line status at regular intervals. Click on a specific port to view that port's communication parameters and status.

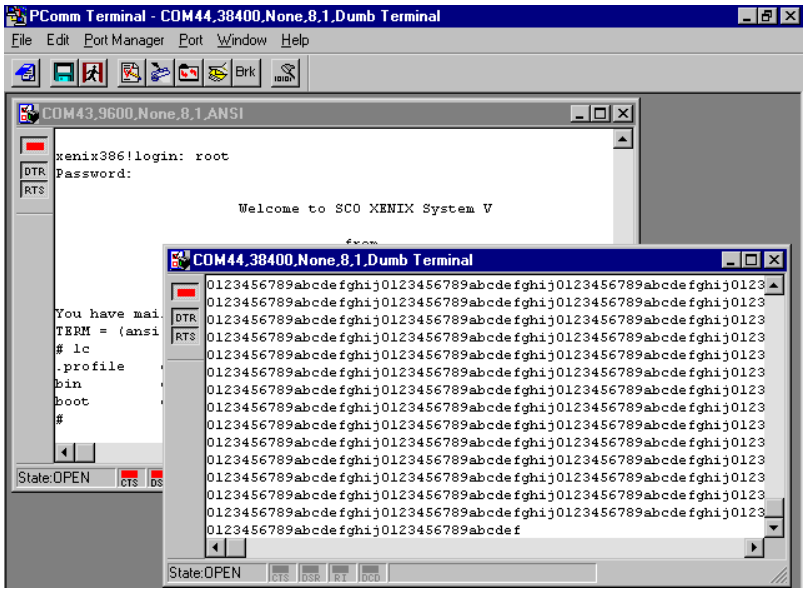
To run PComm Monitor, go to **Start → Program → PComm Lite → Monitor**.



PComm Terminal Emulator

PComm Terminal Emulator can be used to connect to a serial port to verify that data transmission is functioning correctly. It supports multiple windows and both VT100 and ANSI terminal types. You can interactively transfer data, periodically send patterns, and transfer files using ASCII, XMODEM, YMODEM, ZMODEM, and KERMIT protocols.

To run PComm Terminal Emulator, go to **Start → Program → PComm Lite → Terminal Emulator**.


PComm Terminal - COM44,38400,None,8,1,Dumb Terminal
File Edit Port Manager Port Window Help
Brk
COM43,9600,None,8,1,ANSI
DTR
RTS
xenix386!login: root
Password:
Welcome to SCO XENIX System V
You have mai
TERM = (ansi
# lc
.profile
bin
boot
#
State:OPEN
COM44,38400,None,8,1,Dumb Terminal
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State:OPEN
CTS
DSR
RI
DCD

5

Pin Assignments

The box header connector(s) on the module is used to connect to serial devices. Optional cables are available that provide DB9 or DB25 connectors. The pin assignments of the box header connectors and available cables are provided below.

Box Header Pin Assignments

RS-232

These pin assignments apply to the CB-108 and CB-114. Note that there are two 40-pin box header connectors on the CB-108, each of which connects to 4 serial ports.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	DCD0	11	DCD1	21	DCD2	31	DCD3
2	DSR0	12	DSR1	22	DSR2	32	DSR3
3	RxD0	13	RxD1	23	RxD2	33	RxD3
4	RTS0	14	RTS1	24	RTS2	34	RTS3
5	TxD0	15	TxD1	25	TxD2	35	TxD3
6	CTS0	16	CTS1	26	CTS2	36	CTS3
7	DTR0	17	DTR1	27	DTR2	37	DTR3
8	---	18	---	28	---	38	---
9	GND0	19	GND1	29	GND2	39	GND3
10	---	20	---	30	---	40	---

RS-422, 4-wire RS-485

These pin assignments apply to the CB-114 and CB134I.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	TxD0-(A)	11	TxD1-(A)	21	TxD2-(A)	31	TxD3-(A)
3	TxD0+(B)	13	TxD1+(B)	23	TxD2+(B)	33	TxD3+(B)
5	RxD0+(B)	15	RxD1+(B)	25	RxD2+(B)	35	RxD3+(B)
7	RxD0-(A)	17	RxD1-(A)	27	RxD2-(A)	37	RxD3-(A)
9	GND0	19	GND1	29	GND2	39	GND3

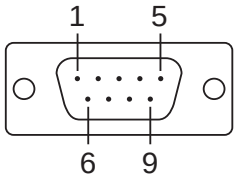
2-wire RS-485

These pin assignments apply to the CB-114 and CB134I.

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
5	Data0+(B)	15	Data1+(B)	25	Data2+(B)	35	Data3+(B)
7	Data0-(A)	17	Data1-(A)	27	Data2-(A)	37	Data3-(A)
9	GND0	19	GND1	29	GND2	39	GND3

Serial Cable Pin Assignments

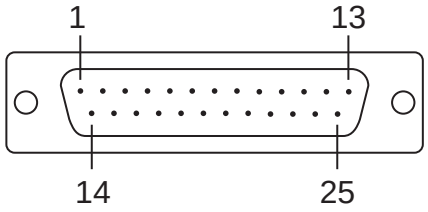
DB9(M) Connectors



The CBL-F40M9x4-50 and CBL-F20M9x4-50 cables provide DB9(M) connectors for each serial port, with pin assignments as follows:

Pin	RS-232	RS-422 4-wire RS-485	2-wire RS-485
1	DCD	TxD-(A)	---
2	RxD	TxD+(B)	---
3	TxD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR		
7	RTS		
8	CTS		

DB25(M) Connectors



The CBL-F40M25x4-50 and CBL-F20M25x4-50 cables provide DB25(M) connectors for each serial port, with pin assignments as follows:

Pin	RS-232	RS-422 4-wire RS-485	2-wire RS-485
2	TxD	RxD+(B)	Data+(B)
3	RxD	TxD+(B)	---
4	RTS	---	---
5	CTS	---	---
6	DSR	---	---
7	GND	GND	GND
8	DCD	TxD-(A)	---
20	DTR	RxD-(A)	Data-(A)